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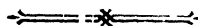
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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Wheat Lands of the World.

The wheat area of the British Empire continues to grow. The latest published statistics show that 11,000 acres of wheat land in Great Britain were put to other use in 1910; but New Zealand balanced the loss by putting a like acreage under wheat, and India, Canada, and Australia added 4,018,000 acres to the wheat lands of the Empire. The wheat area of the United States increased by 2,482,000 acres, and that of Argentina by 1,029,999 acres. Russia reported the immense addition of 5,620,000 acres, but there appears to be some doubt whether this is not partly attributable to more complete statistics. Altogether, in the countries tabulated, there was an apparent net addition to the wheat area of rather more than 15,000,000 acres, or over 6 per cent. on the area returned in those countries in 1909. The wheat area in the British Empire increased, between 1891 and 1900, by three and a quarter million acres in Australia, six and a half million acres in Canada, and five and a quarter million acres in India, and declined during the same period by half a million acres in the United Kingdom and 80,000 acres in New Zealand.—*The Farmers' Advocate*.

Diseases Among Live Stock.

A number of cases of serious sickness among live stock have been reported to the Editor and through the Agricultural Bureau recently, and the assistance and advice of the Stock Department has immediately been solicited on behalf of the owners. In any case of urgency, however, it would be better if owners would communicate direct with the Chief Inspector of Stock by wire or letter, so that advice may be forthcoming without any unnecessary delay. The officers of the Stock Department are prepared at all times to give such advice as they can, gratis, to stockowners, farmers, and others, and reports of sickness should be sent as promptly as possible when disease appears among stock, or when sudden or suspicious deaths occur. Under the Stock Diseases Act owners are required to take very prompt action, as will be seen from the following reprint from the *Government Gazette*: —“Caution to stock owners.—Section 19 of the Stock Diseases Act of 1888 provides that—Every owner of diseased stock shall, within twenty-four hours from the time when such stock have been found to be diseased, forward by post in a prepaid letter notice thereof to the nearest inspector of stock, and to the Chief Inspector of Stock at Adelaide, and shall keep the diseased

stock from coming in contact with the stock belonging to other persons, under a penalty of not less than one pound nor exceeding twenty pounds for each and every day in which he shall neglect to give the required notice." Such answers to questions concerning stock troubles as are likely to be of interest will continue to appear in the inquiry column; and if any casual inquiries are received by the Editor they will be treated as heretofore; but stock owners are urged, in all cases of serious trouble and disease, to communicate with the Chief Inspector of Stock direct.

Agricultural Bureau Congress.

The twenty-fourth Annual Congress of the Agricultural Bureau of South Australia will be held at the School of Mines, North Terrace, Adelaide, on September 9th, 10th, and 11th. In last month's issue the attention of Hon. Secretaries of Branches was drawn to several matters in connection with the Congress, and arrangements for the gathering are now receiving the attention of officers of the Department of Agriculture. As usual, the agenda will include papers by members of Branches, in addition to addresses by the various experts attached to the Department. A novel feature will be a display of weeds and plants. Branches have been invited to forward to the Secretary to the Advisory Board, between the 2nd and 7th of September, any plants or weeds which they desire to have identified. These will be exhibited at the Congress, and the Botanist (Mr. J. M. Black) will give information regarding the various specimens and answer any questions.

The Value of Fallowing.

The July number of *The Agricultural Gazette of New South Wales* contains a striking illustration designed to call the attention of farmers to the value of fallowing. Accompanying the illustration are the following particulars of the general average in various districts of the 1911 wheat harvest, compared with that from experiment farms and farmers' experimental plots:—
"In the north—Average yield on north-western slopes, 8·52bush.; average yields on farmers' experiment plots (cultivated fallows), Quirindi, 34·08 bushels; Delungra, 28·8bush.; Pallamallawa, 29·02bush. In the west—Average yields, central tableland, 10·74bush.; central western slopes, 10·11 bushels; Bathurst experiment farm, 63 acres, Cleveland, Federation, and Bayah (short fallow), 23·5bush. In the south—Average yield on south-western slopes, 12·52bush.; average yield on farmers' experiment plots (cultivated fallows), Harden, 28·9bush.; Mimosa, 25·6bush.; Albury, 20·9 bushels; Wagga experiment farm, 68 acres, Federation wheat (cultivated fallow), 24·1bush."

World's Butter-Fat Record Broken.

With a record of 1,058·34lbs. of butter-fat produced in 365 days, Banostine Belle De Kol, a five-year-old Holstein-Friesian cow, owned by Dan Dimmick and Brother, becomes the new "queen of the dairy world" (says the *Breeders' Gazette*, Chicago). This wonderful cow produced during the year 27,404·4lbs. of milk, testing 3·86 per cent. fat. This means over 9galls. of milk per day, or enough to supply 36 families each with a quart of milk daily. If made into butter, her fat production would equal 1,322·925lbs. of butter, or over 3½lbs. per day for 365 days. This is all the more remarkable because it was made without her being dry at all before freshening. No other cow in the world has ever produced such an enormous amount of butter-fat in a yearly test, and only one other has ever exceeded Banostine's milk record. The official records of Banostine Belle De Kol are as follows:—

Length of Record.	Milk. Lbs.	Butter-Fat. Per cent.	Butter-Fat. Lbs.
7 days	672·5	3·67	24·697
30 days	2,828·0	3·50	98·987
60 days	5,505·0	3·53	194·033
90 days	7,856·8	3·61	283·543
7 days*	492·1	4·31	21·195
365 days	27,404·4	3·86	1,058·340

* This 7-day record was made eight months after freshening.

Banostine Belle De Kol was bred and developed by Dimmick and Brother. She is a strong, vigorous cow, of wonderful capacity, and will weigh in the neighborhood of 1,600lbs. She has given birth to three calves, this record having been made after the birth of the third calf. All of her calves have been heifers. The test was made under the careful supervision of the Dairy Department of the Ohio State University, America. The cow was tested by nine different persons, and watched at times day and night, so that the record is fully verified.

Fruit Production.

Particulars furnished by the Government Statist show that the area under fruit culture has been steadily increasing during the last five years. According to the latest returns 23,214 acres are now devoted to this purpose as against 22,410 acres in 1910-11. Below will be found the production of the chief kinds of fruit last season, the figures in parentheses being the production for the preceding year:—Apples, 583,860 (476,904) bushels; apricots, 165,982 (145,213) bushels; pears, 81,644 (80,868) bushels; oranges, 220,988 (153,464) bushels; lemons, 47,176 (44,799) bushels; cherries, 42,607 (45,085) bushels; plums, 106,758 (94,217) bushels; peaches and nectarines 80,315 (59,406) bushels.

Facts About Renmark.

The following particulars relating to the Renmark Irrigation Settlement are taken from *The Renmark Pioneer* :—Population (town and settlement), 2,500 ; area of settlement, 13,348 acres ; dedicated commonage, 16,652 acres ; area under irrigation, 5,156 acres ; annual production, value £130,000 ; dried fruit pack, 1912, 2,200 tons ; Irrigation Trust assessment, £200,000 ; Trust machinery and channels, £55,000 ; annual firewood consumption, 6,000 tons ; annual water rate per acre, 1911, 25s. ; Trust annual revenue, 1911, £8,082 ; annual Government loan repayment, £880 ; Trust D.C. assessment, 1911, £9,465 ; D.C. revenue (1s. rate, &c.), 1911, £1,307. Renmark fruitgrowers use annually about 5,000 tons of gypsum and large quantities of artificial fertilisers. Five irrigations are given annually. Chief products are sultanas, currants, raisins, oranges, apricots, peaches, pears, and olive oil, all of the highest quality. At Renmark and along the river generally, apples and all temperate fruit trees thrive and become productive much earlier than in colder districts dependent on the rainfall. Lucerne, maize, and all fodder plants do well, and wheat yields fair returns without irrigation. Renmark town population, 800 ; Renmark town valuation, £89,260 ; D.C. assessment, 1911, £3,852 ; D.C. revenue (rate 2s. 3d.), 1911, £463.

Fertility of the Soil.

Dr. A. D. Hall, M.A., F.R.S., Director of the Rothamsted Experimental Station, lectured recently before the Royal Institution on "The Fertility of the Soil," dealing with his subject particularly from the standpoint of the experimental work conducted at Rothamsted, Sir William Crookes being in the chair. Experiments at Rothamsted, said the lecturer, had shown that the addition of carbonaceous matter in the form of sugar to a Rothamsted plot poor in nitrogen had greatly increased the yield in barley. It was possible, Dr. Hall went on to show, that a production of over four quarters per acre of wheat could be maintained indefinitely by natural agencies alone, provided that the small annual losses of phosphoric acid and potash were replaced. The prospect of reducing the waste of highly intensive agriculture was not entirely hopeless. The losses were due to bacteria, which attacked nitrogen compounds and liberated nitrogen, but the researches of Dr. Russell and Dr. Hutchinson had shown that by putting the soil through various processes of partial sterilisation, such as heating or treatment with anti-septics like chloroform or toluene, certain organisms which checked the useful bacteria of the soil could be eliminated. Heating the soil to the temperature of boiling water for 10 hours would double its productivity, and the process had been found commercially profitable in the case of greenhouse soils. The market growers of cucumbers and tomatoes made up an exceptionally

rich soil of virgin loam and stable manure ; but in a few years such a soil, while still enormously rich on analysis, became incapable of growing a profitable crop. Partial sterilisation enhanced the fertility of this soil by eliminating the injurious organisms. At present these processes had not been extended to the open field, but progress was being made in that direction, and gave some promise of a method by which ultimately the unseen fauna and flora of the soil would be domesticated, the useful races encouraged, and the noxious repressed, just as the larger flora and fauna had been reduced to the service of man since primitive man first turned from hunting to agriculture.

New Zealand Crops.

In publishing the average yield of field crops in New Zealand for the season 1911-12 the Dominion Government Statistician notes that the weather conditions experienced had a bad effect on root crops, but very favorably influenced the yield of cereal crops. The average yield per acre of the principal crops were :—Wheat, 36·69bush. ; oats, 48·71bush. ; barley, 39·65bush. ; and potatoes, 5·13 tons.

Manuring Turnips.

In reference to the manuring of the turnip crop, including swedes, there is a significant table in a leaflet issued by the Irish Department of Agriculture. It gives the average results in yield and money value of the crop, after deducting the cost of manures, of 227 tests carried on in every county in Ireland during 10 years, farmyard manure being valued at 4s. per ton, artificials at their cost, and turnips at 8s. per ton. A dressing of 20 tons per acre of farmyard manure alone gave a greater yield, but less profit than half the quantity of manure, and when the addition of 4cwts. of superphosphate was made to 10 tons of farmyard manure, the yield was a little greater than that of 20 tons, while the profit from the dressing was largely increased. The further addition of 1cwt. of sulphate of ammonia brought the yield still higher, but reduced the profit ; and the still further addition of 3cwts. of kainit brought the yield up to the maximum. but with another reduction in profit. When artificials were used alone, it is hardly necessary to say, a complete mixture proved most advantageous ; but it is noteworthy that in 1911 every application without farmyard manure gave a greater profit than the corresponding one with the natural manure. Moreover, the highest average yield in a number of trials was 27 tons 12cwts. per acre, from the application of 6cwts. of superphosphate, 1½cwts. of sulphate of ammonia, and 4½cwts. of kainit, leaving a profit of £5 7s. 3d. ; whereas 15 tons of farmyard manure, 4cwts. of superphosphate, 1cwt. of sulphate of ammonia, and 3cwts. of kainit gave only 24 tons 5cwts., and a profit of £2 5s. 7d. It is true that the residual

value of the dressing, including the farmyard manure, would be greater than that of the artificial alone, but where the natural manure is short, it is satisfactory to be able to secure a maximum crop without it, and at the same time a higher profit so far as the crop of the season is concerned.—*Agricultural Gazette*.

Maize for Forage Purposes.

The Essex Education Committee have made a report on the use of maize for forage purposes. The great need of a dairy district, particularly in a dry summer, is an adequate supply of succulent fodder. As maize is eminently adapted to meet this requirement, it was decided to test the relative cropping powers of some of the best-known Canadian and English varieties. The English varieties tested were White Tooth, Early Prolific, and Red Cob, the Canadian being Selected Leamington, Wood's Northern Dent, Eureka, White Pearl, and Superior Fodder. Owing to the lumpy condition of the soil when the seed was sown, the weights of forage obtained were comparatively small, the heaviest crop obtained being 13 tons 8cwts. per acre. Comparing the different varieties, White Tooth was superior to Red Cob, but the first three Canadian varieties—Selected Leamington, Wood's Northern Dent, and Eureka—were much superior to the English varieties. Not only was the weight per acre greater, but on their being chopped up they were found to be much more succulent.

Imports and Exports of Plants.

During the month of July 5,136bush. of fresh fruits, 2,834 bags of potatoes, 1,429 bags of onions, 27pkgs. vegetables, and 30pkgs. plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 374bush. of bananas (chiefly over-ripe) were rejected. Under the Federal Commerce Act, 1,879 cases of fresh fruits, 99pkgs. of dried fruit, 108pkgs. preserved fruit, and 11pkgs. plants were exported to oversea markets during the same period. These were distributed as follows:—For South Africa, 1,000 cases apples, 99pkgs. dried fruit, and 1pkg. seeds; for London, 37 cases oranges; for India and East, 790 cases apples and 93pkgs. preserved fruit; for New Zealand, 52 cases citrus fruits, 15pkgs. preserved fruit, and 10pkgs. plants. Under the Federal Quarantine Act 1,354pkgs. plants, seeds, &c., were admitted from oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

STOCK INQUIRIES.

(Replies supplied by Veterinaries of the Stock Department.)

Paralysis in Horse.

The Coomooroo Branch of the Agricultural Bureau ask the best treatment for a horse suffering from paralysis. The animal has, for a period of six weeks, been unable to move, and it appeared stiff in all its muscles.

Answer—The horse should be placed comfortably in slings, and one grain of strychnine mixed with a little sugar should be placed on the back of its tongue twice daily. Three times daily a teaspoonful of iodide of potassium should be given in the drinking water. Only a little hard feed should be given, the animal being fed on bran and, if possible, greenfeed.

Probable Case of Worms.

"E. O.," Leighton, had a young horse troubled with swellings under the belly just behind the girth. The sheath also swelled considerably and remained so for a few days at a time. The water was scanty, and the animal was tender under pressure on the loins. The owner desired to know the cause of the trouble and the remedy.

Answer—From the symptoms described, it is very probable that the young horse is badly affected with worms, as the dropsical conditions noted frequently result from their presence. It would be well to mix a level tablespoonful of a powder composed of the following twice a day in the food:—Epsom salts, 4ozs.; sulphate of iron, 2ozs.; flowers of sulphur, 2ozs.; powdered gentian root, 2ozs.; salt, 4ozs.; linseed meal, 1lb. Also keep the animal well fed and sheltered at night.

An Overdose of Kerosine.

The Petina Branch of the Agricultural Bureau reports the loss of three horses belonging to one of its members. The last of the animals to die was

a five-year-old gelding, which appeared to be in good condition, and had been worked right through seeding until it suddenly became ill. After it had been ill for three weeks it was given a drench of soda bicarbonate, and after that saltpetre. For three days it seemed all right, but then the trouble returned. It would attempt to feed in the morning, but commenced throwing its head up. A dose of linseed oil was administered, but apparently without any effect. This was followed by a dose consisting of a bottle of kerosine. The animal died soon after. A *post mortem* failed to reveal any rupture in the stomach, although the oil appeared to be outside the paunch, which, together with the intestines, was inflamed. The latter were surrounded by a watery fluid. The liver, lights, and heart seemed normal. In the paunch were found 10 grubs firmly fixed to the lining, and a small stone. About one-third of the paunch gave the appearance of having had the lining eaten off. No sand or worms were in the intestines.

Answer—It is to be feared that the horse died from the direct effects of an overdose of kerosine, a bottleful of that oil being far too much for a horse; the maximum dose should not exceed a wineglassful, and that should be well diluted with linseed oil or milk. The 10 grubs were no doubt “bots,” that is the larva of the fly which lays its eggs on the hair, and which develop in the horse’s stomach. The eating away of the stomach was probably a natural process which occurs after death, and is called *post mortem* digestion; but it must be remembered that one part of a horse’s stomach is white and the other pink; the latter is more active in digestion. It is impossible to form an opinion as to the cause of the illness of the horses from the few symptoms described, but it is probably due to a weakening fever which is prevalent at this time of the year, and it would be well to let the others have an ounce of Epsom salts mixed up in their food once a day for a week as a preventive. Give this quantity three times a day if they are ill; and if they are too much off their feed to eat it, they would drink it in half a bucket, or could be drenched with it in half a bottleful, of water.

POULTRY INQUIRIES.

Black Blotches on Roosters’ Combs.

“A.B.H.,” of Mount Cooper, asks for a remedy for large black blotches which have made their appearance on the combs of White and Black Leghorn roosters. The general health of the birds did not appear to be affected, and the spots did not seem to extend below the skin.

Answer—Without making an examination it is difficult to state the cause. Similar affections may be cured by bathing the comb with a 5 per cent. solution of carbolic acid, or of ordinary bluestone. If you have any formalin, apply daily a solution consisting of one part of formalin to nine parts of water.

THE POULTRY TICK.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

[Paper read before the members of the Microscopical Society of South Australia, June 25th, 1912.]

(Continued from page 1258.)

DESCRIPTION OF THE TICK.

With the aid of the following illustrations it will be possible to make clear the main structural points, and also to elucidate many facts in the life history of the tick.

Plate 1.—Adult tick (female), ventral (underside) aspect, x 9. The ovate form of the body is clearly seen. The adult tick has four pairs of legs, and

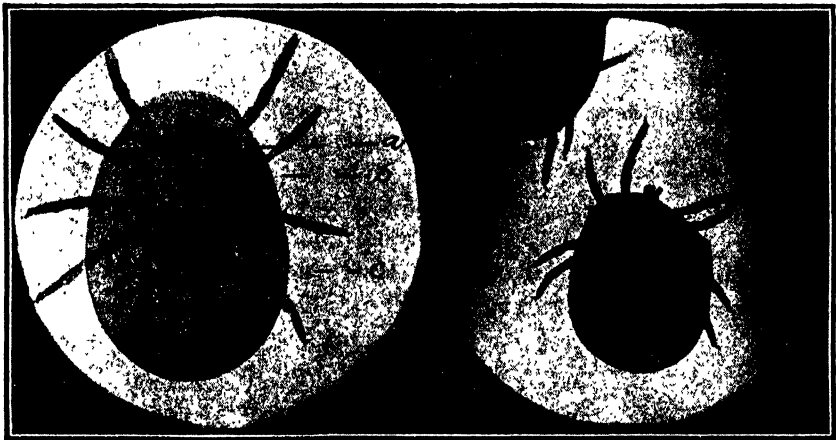


PLATE 1.

PLATE 2.

its mouth parts (a) are so situated as to be invisible when viewed from above (dorsal view); (b) is the genital orifice, and (c) the anal ring. Each of the eight legs is furnished at the end with a double sickle-shaped claw, which enables it to cling tightly to any surface which offers the least irregularity. Thus it can climb woodwork, stone or brick walls, piping, and even thin wires. The legs have six segments, or articles, as they are termed. That nearest the body is the coxa, then come the trochanter, femur, tibia, protarsus, and

tarsus, always visible—and there may be additions. Articles 1 and 6 are generally referred to as coxa and tarsus, and the others by numbers. Large females measure up to 9mm. long by 5.8mm. broad. Four measured 8×5.5 , 8.5×5.2 , 8.0×5.5 , and 9×5.8 mm.



PLATE 3.



PLATE 4.



PLATE 5.

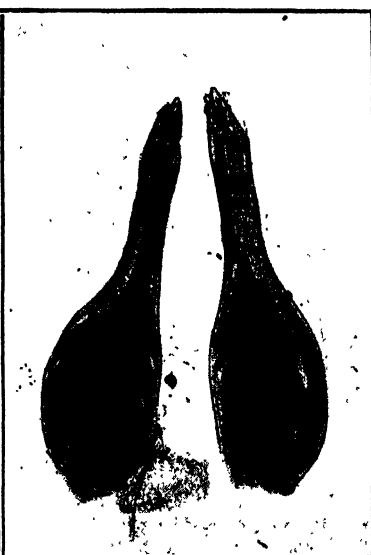


PLATE 6.

Plate 2.—Dorsal view of a medium-sized tick, x 7. This illustration shows a tick of medium size. Part of the integument forming the hood has been

thrown back to show the position of the mouth parts. This specimen is cleared and is semi-transparent. The cavity in which the mouth parts lie is called the camerostome, of which the hood forms the walls.

Plate 3.—Mouth parts of adult tick x 65. This enlarged view of the mouth parts gives excellent detail. Here can be seen clearly (a) the rostrum or hypostome—the biting mouth parts which the tick inserts into the skin of the host. (b.b.) the palpi (pedipalpi), which are leg-like appendages, one on each side of the rostrum or hypostome. These palpi are in constant motion and doubtless are extremely sensitive and serve as organs of sensation. (c) is the capitulum, the basal ring or false head.



PLATE 7.

Plate 4.—Mouth parts of adult tick x 65. This illustration shows very clearly the palpi and the rostrum with its mandibles or chelicerae, which are saw-toothed. This latter is the organ by which the tick cuts and tears the skin when preparing to feed. The bulb-like muscular processes of the mandibles are clearly visible.

Plate 5.—Details of mouth parts x 100. This clearly shows the closed maxilla or hypostome (also known as the radula or labium). The saw-tooth-like cutting apparatus is well shown.

Plate 6.—Mandibles of fullgrown tick x 60. These were dissected out by Mr. Poole, and serve to show clearly their formation as well as the lower end referred to in Plate 4.

Plate 7.—Mandibles of fullgrown tick x 100. This shows more detail of the structure of the mandibles. In the tick the mandibles or chelicerae consist of the (1) internal article ("median apophyses, or immovable finger"), and (2) the external article (external apophyses, or free movable finger).

THE LIFE CYCLE OF THE TICK.

Reference has been made to the prevalence of the tick in many parts, not only of this State, but of Australia generally. The following description, with the illustrations, will show the habits and character of the tick as well as the various stages of development.

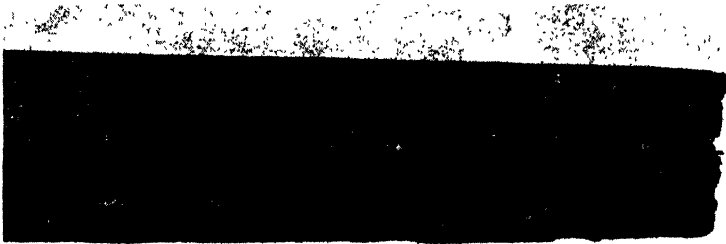


PLATE 8.

Plate 8.—This piece of wood was in close contact with a post in a fowlhouse. The clusters of ticks of various sizes can be seen, and will give a good idea of what is commonly met with when examining infested premises. Tick can live for long periods without having recourse to fowls for food. I am inclined to think that in the absence of poultry the tick finds some other food; may, in fact, return to its original feeding habits (and consume decaying vegetable matter). I have had a pair of full-grown ticks in a bottle (2oz.) well corked, they lived for 18 months; but someone took the bottle, so that no further tests could be secured. If a number of ticks be put in a small jar they will soon die, unless the lid be perforated. This has happened on many occasions.

In examining old and disused poultry houses the ticks found show little vitality, and are apparently quite empty, and appear very flat. However, let some fowls roost in that house and the tick, with its uncanny sense of the presence of a fowl, will, as soon as dark speedily attack the bird.

FEEDING.

The tick feeds about once a month in hot weather, and requires that period in which to fully digest a meal. When gorging rapidly, Nuttall says they discharge clear fluid from the intercoxal spaces. During the growing period,

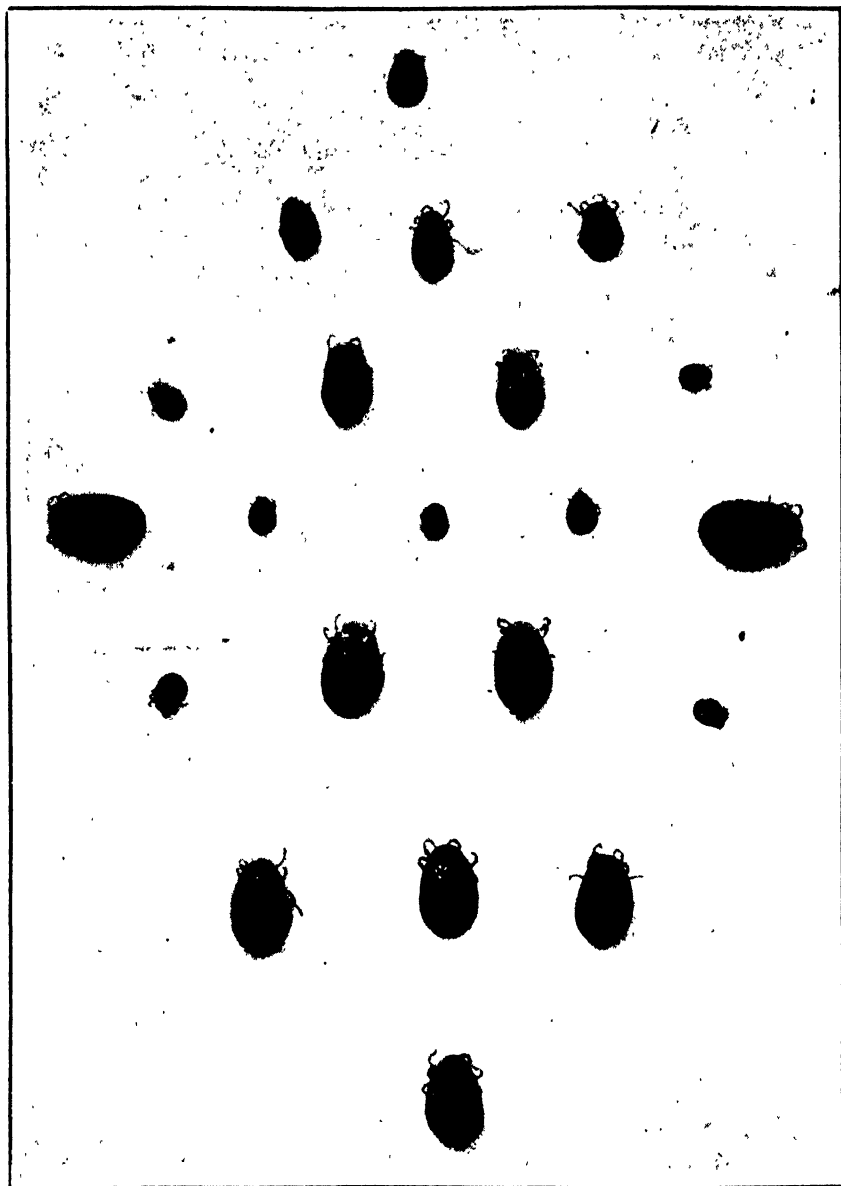


PLATE 9.

after digesting each meal, they undergo a moult, and cast their old skin and grow in the process until the adult stage is reached. A large jar containing a hundred or so specimens soon becomes littered with the accumulations of moulted skins. The adult female tick begins laying about a week after she



PLATE 10.

has fed. She deposits small batches of eggs (20 to 100), and may often be observed doing so on the sides of the specimen jar in which they are kept. She will lay several eggs in a minute. Nuttall reports that it took 10 months to rear tick from egg-stage to egg-stage.

Plate 9.—Shows a life-sized photograph of the full-grown tick, both dorsal and ventral views. Ticks take refuge in and infest the paling fences in the suburbs; they gradually extend along the fence for great distances, congregating in the vicinity of poultry houses which generally adjoin the fence. The adult tick will travel from an infested fence or old shed to a new poultry house. It, therefore, is absolutely necessary to seek them out and destroy them before the poultry can be considered safe.

HOSTS.

Plate 10.—Fowls are most commonly attacked by ticks. Turkeys, as a rule, roost on the tops of sheds and in high trees, and are seldom attacked. In suburban poultry yards where turkeys are placed to roost in an infected fowlhouse, they are also attacked and often succumb. *Plate 10* shows the head and neck of a common duck which was freely infested with larval ticks. Ducks often feed at night, and are generally restless and, as a rule, are not subject to attack.

Pigeons have been found infested with ticks but, as a rule, they are free from attack. Pigeons are very restless at night. Probably the pigeon as a host is not agreeable to the poultry tick here.

Lounsbury relates that he "once applied an adult to my arm, giving it free play under a pill box. It took hold and fed quite regularly, coming off engorged in about an hour; but its feast appeared to disagree with its digestion, for it soon turned black and decayed."

The human normal temperature is 98.4 (F.), that of fowls 106 (F.). This difference may have affected the tick in some way. Again, the chemical composition of the blood of man and of the fowl differ in their mineral salts. In Persia, strangers visiting the country, if bitten by the ticks, may become ill. The natives have acquired immunity. The trouble there is due no doubt to the spirochæte. The difference in body temperature and blood composition would favor progressive immunity.

Plate 11.—This shows a cockerel which was in parts literally encrusted with larval ticks in several stages of repletion. The bird was received from the country by a poulterer, who noticed the ticks when plucking the bird and after the left leg had been stripped. The specimen was placed in cold storage and held for some days in a temperature well below freezing point. This extreme cold apparently did not incommode the ticks, which were alive and well. Ticks do not always leave the host when the latter dies. Some ticks do, but the majority remain attached for several hours, even after the body has become quite cold.



PLATE 11.

Plate 12.—This shows part of the right side of the fowl shown in Plate 11. It will be noted that the ticks have congregated chiefly upon the bare skin (apteriæ), outside the feather tracts (pterylæ). There were many hundreds, perhaps thousands, of ticks on this fowl, which was in good condition for a



PLATE 12.

cockereel. The bird was bright and active, and showed none of the usual effects of the ticks, and yet he must have harbored them for some days.

Plate 13.—Micro-photograph of piece of skin of fowl shown in Plates 11 and 12, x 10. Examination of this plate reveals the fact that the larvæ have been feeding for some time, as they have assumed the oval shape with less prominent mouth parts.



PLATE 13.

PLATE 14.

Plate 14.—Micro-photograph of ovigerous full-sized female tick x 8. The remarkable feature of this specimen is the presence, clearly seen, of at least three eggs. The centre egg appears about to enter the ovipositor. With a low power (x 50) objective the ovipositor can be readily observed. It is the organ by means of which the eggs are extruded. By slightly irritating the part with a dissecting needle vigorous contractile movements can be noted. Fertilisation is effected by the male transferring spermatophores into the genital orifice of the female by means of his proboscis or rostrum.

(To be continued.)

FARM ANIMALS.

TREATMENT OF INJURIES (HORSE).

By OFFICERS OF THE STOCK DEPARTMENT.

The injuries to be dealt with in these notes are bruises and wounds, and some conditions in which both occur.

BRUISES.

Bruises happen both while at work and in the paddock—in the latter case from hitting up against low branches and so on, or rolling on hard and stony ground; and naturally the prominent parts, such as the poll, withers, and haunches suffer most. Bruises in the two former places are often the commencement of fistula. Kicks given in play or viciously are also a common cause of bruising, which is then generally on the legs, breast, or ribs. Bruises caused during work generally arise from pressure of badly-fitting harness or saddlery, and may be classed as collar or saddle galls.

The early symptoms are the same in all cases—tenderness, pain, swelling, at first hard, then gradually becoming soft and watery to the touch. These early symptoms are often overlooked, and the first noticed are a fluctuating swelling, with hair and skin being stripped. Where the skin is too tough to strip, as in the case of many saddle galls, the fluid inside changes in its nature and becomes hard and fibrous, resulting in a permanent lumpy swelling. In collar and saddle galls, where the pressure is intermittent, other changes occur in the structures beneath the skin, which at times render the treatment difficult. In the early stages of all bruises relief is obtained by frequent fomentations with water as hot as the hand can bear it, following this up with applications of tincture of arnica one part, methylated spirits twenty parts—roughly an ounce of the former to a pint bottle of the latter.

Space forbids the detailed treatment of collars and saddles being dealt with, but if they are properly *chambered* the horse will recover more rapidly at work than at rest. Should the swelling be soft and fluctuating the watery fluid must be let out by the use of a sharp lancet, at a point where it will drain well and the surgical wound will escape irritation from pressure. Should the fluid persistently re-form, the sac must be syringed out with a strong solution of Condyl's crystals—as much as will lie on a threepenny piece to two quarts of boiled water which is cooling down again. If the galls are

badly stripped, an application of neatsfoot oil and white lead, mixed to the consistency of cream, will often enable a horse to go on working and heal the sore at the same time.

When hard lumps have formed the surgeon's knife will effect a speedier and more effective cure than applications; though in some cases the lumps may be reduced by painting them daily with strong tincture of iodine.

WOUNDS.

Wounds among farm horses are generally stakes, cuts, tears, or a combination of the latter and bruises, as in broken knees. Stakes are the most dangerous, because dirt, which means harmful microbes, is carried deeply into tissues which are damaged by the forcible passage of the stake into them and rendered less able to deal with the invaders, often, too, serious damage is done which does not meet the eye.

Staked wounds must be constantly flushed out with a strong solution of Condyl's crystals or permanganate of potash, and whenever they occur in a position where a lower opening will give a thorough drainage, one should be made. If the wound is very large it may be plugged with antiseptic tow; but as a rule it is better left open. If, however, flies are troublesome it should be covered, and eucalyptus oil or some similar strong-smelling application put on to keep them off. Care must be taken that healing commences from the deepest part of the wound, as if the outer portion heals and encloses dirt, very serious results, such as blood poisoning and lockjaw, are likely to follow.

Cuts, if deep, must also be healed from the bottom, and unless they are very superficial it is, as a rule, not advisable to sew them up, as the swelling which occurs generally bursts the stitches out and makes a bigger scar than the original cut would have left, in addition to covering up dirt. If flaps of skin have to be held in place, a few strong pins, with horsehair or silk made into a figure of eight round them, will give a better hold than stitches.

The cuts must first be thoroughly cleaned out. When once this has been done, the fewer wet dressings they get the better they will heal. A good dry dressing is flowers of sulphur one part, boracic acid seven parts. If the cut is in a position in which a dry dressing persistently falls off, it may be made into an ointment with olive oil or vaseline. Tears, especially those caused by barbed wire, are the most difficult class of wound to heal. It is of little use trying to get rags of skin or tissue to heal on a tear, and they may be cut off at once, as any attempt to sew them on will only be disappointing and hinder healing. When the wound has been cleared of all bits of tissue and dirt—and the cleaning is helped by the use of soap and warm water—it should be dressed with a solution of Condyl's crystals, or similar dressing, and the dry dressing applied after. Often an artificial scab of Friar's Balsam and olive oil will protect places where too much of the

underlying tissues is exposed. When healing is slow and the edges of the wound remain angry-looking or slough away, an occasional painting with tincture of iodine will stimulate the healing process.

Wounds like broken knees, in which cuts, tears, and bruises are found together, require the preliminary thorough cleansing and the after treatment above described ; but at the same time the part must be kept as still as possible by means of splints and bandages, and the less wet dressing it gets the better.

When injuries such as those above described occur in the neighborhood of joints, the synovial membranes or oil bags of the joints are often opened or otherwise damaged, and the persistent flow of joint oil is frequently hard to check ; the measures which are often used to do so excite inflammation, and the joint is ruined altogether. A safe remedy in the farmer's hands is a paste made of starch or white of an egg seven parts, and so-called chloride of lime or bleaching powder, one part. A liberal application of this mixture will both stop the flow of oil and assist the healing.

BEE-KEEPING NOTES.

THE LEG STRUCTURE OF A WORKER.

By T. E. WHITELAW, Inspector of Apiaries.

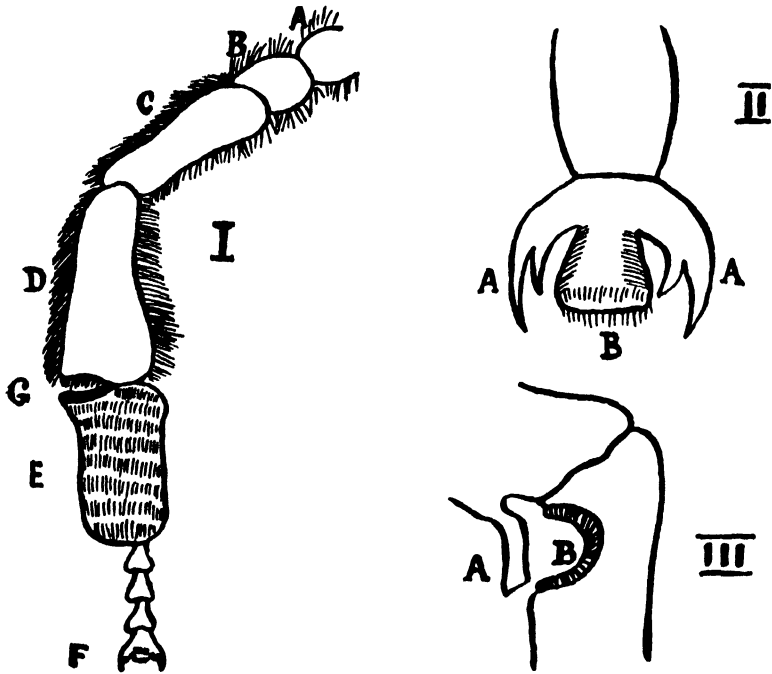
An adult worker bee possesses three pairs of legs, which are attached to the muscular centre—the thorax. The anterior pair are joined to the pro-thorax ; the intermediate to the meso-thorax ; and the posterior to the meta-thorax.

A superficial examination of these legs reveals that these members, while serving the insect with the means of locomotion, also provides it with various contrivances suitable for the performance of its work. Structural adaptations are strongly in evidence which assists it to act as a conveyor of pollen from one flower to another.

Each leg is composed of nine segments. The first joint, the coxa, is round and short, forming the attachment to the thorax ; the second, the trochanter, has a somewhat similar appearance, and is followed by an elongated limb termed the femur, or thigh ; the fourth is the tibia, or shank ; the last five

joints are collectively called the tarsus, or foot, the first joint of which, the meta-tarsus, is larger than any of the other four. The terminal joint, though small, has an intricate structure comprising a pair of hooked claws with a cushion—the pulvillus—between them.

The thorax and the legs are densely covered with pubescence, forming a covering both protective and heat retaining. The hairs are various in shape and have special functions. Some are adapted for gathering and retaining liquid and pollen dust, others act as brushes and organs of touch.



Rough Diagram showing Anatomy of a Worker Leg.

I. Posterior leg, side next to body—A, coxa; B, trochanter; C, femur; D, tibia; E, metatarsus; F, angiculi; the reverse side of D, the corbicula.

II. Angiculi—A, angiculi; B, pulvillus.

III. Junction of tibia and metatarsus anterior leg—A, velum; B, antenna comb or sinus.

The posterior legs are the most interesting to examine. The joints nearest the body are to a large extent muscular. The outside surface of the tibia is concave, forming a hollow basket, or corbicula, fringed along its outer edge with long curved hairs. This is the receptacle in which the gathered pollen dust is conveyed to the hive.

The bottommost edge of the tibia, where it meets the meta-tarsus, has a row of teethlike hairs. Immediately below these, is a flat surface at one corner of the meta-tarsus, upon which they open and shut by means of the joint at the opposite corner. This apparatus is commonly known as the

wax pincers, and serves to manipulate the thin scales of wax generated by the wax glands on the ventral surface of the abdomen. It is also used for packing the pollen into the corbicula. This appliance is not found in the queen and drone, as neither of these insects are wax-producing.

The inside surface of the leg is covered with a series of stiff hairs arranged in rows, forming a perfect comb. The bee, when foraging for nectar and pollen, invariably has the underside of its body dusted with pollen grains from the anthers of the flowers. These grains are scraped from the hairs on its body by means of the comb, and carefully packed in the corbicula for conveyance to the hive. The long hairs fringing the corbicula serve to retain the pollen in position during its journey.

The terminal joint of the tarsus is furnished with a pair of hooked claws—the *anguiculi*—which are double-pointed. Between them is a cushion called the *pulvillus*. The claws are capable of ready movement in every direction, turning sideways or upwards if necessary. A tenacious grip is readily obtained on any surface of an ordinary nature. When, however, the insect comes in contact with a hard polished plane the claws turn upwards out of the way and the *pulvillus* comes into close contact with the surface. It is a soft membranous pad from which exudes an adhesive liquid derived from a glandular sacculus situated in the tarsus. By its means the insect can walk with ease, even on highly polished glass. That this adhesion is not produced by atmospheric pressure alone, is proved by the fact that flies continue to adhere to the interior of a vessel from which the air has been exhausted.

At the lower end of the tibia on the anterior pair of legs, a spine is found to which is attached the *velum*. On the adjacent edge of the *meta-tarsus*, beneath it, is a curved recess known as the *sinus*, the edge of which is composed of stiff, bristly hairs. The *antennæ* of the insect is cleaned by the operation of these appliances. The leg is brought up to the *antennæ* so that the latter lies securely in the *sinus*, the *velum* is pressed down on to it tightly, and the movement of the leg outwards removes every particle of dirt.

The intermediate legs possess no *velum* or *sinus*, but in the same position is a stiff pointed spur. The exact use of this article is debatable. By some persons it is supposed to be a lever for removing pollen pellets from the corbicula; others consider it simply as a collateral support, or as a wing cleaner.

The activity of a bee is well known. Its power of traction is equal to 20 times its own weight.

GRAPE VINE PRUNING FOR AMATEURS AND BEGINNERS.

By GEO. QUINN, Horticultural Instructor.

(Continued from page 1238, July Issue).

TRELLISED VINES.

From an economic point of view the trellising of grape vines is undertaken for the purpose of utilising in the fruit production the vigorous growth obtained from many varieties when planted in strong soils. Although, to a certain extent, this is an extension of the principle observed in retaining rods on bush-grown vines, it does not completely fulfil the same purposes, as some kinds, even when trellised, require to be rod-pruned if full crops of fruit are to be harvested from them.

Apart from the purely economic aspect, grape vines are often trellised for the purpose of covering unsightly buildings, shading sun-exposed walls, or ornamenting arbors, pergolas, &c.

It may truly be claimed that under favorable conditions of soil and climate nearly all vines, whether of rod or spur-pruned sorts, would yield much heavier crops if trellised; but the initial cost of the trellising is considerable, and this fact often deters the owners from thus training the plants. On the other hand, the impediment to cross tillage of the land—so desirable under the dry conditions prevailing in many parts of Australia—is an argument against the use of trellises.

Assuming, therefore, that trellising is done for the purpose of securing growth and fruit over all of the space afforded by any such structure, it becomes necessary to follow a systematic plan in the training of the vine which shall secure this end over the longest possible period of years.

Fig. 16 fairly represents the too common lack of system as displayed in many of the vines grown by amateurs for the purpose of covering an unsightly wall. In dealing with observed facts in the growth of plants which underlie the principles governing pruning, attention has been drawn to an unvarying superiority enjoyed by the topmost shoots in receiving sap. Whilst this cannot be too strongly emphasized in respect to shoots on the grape vine, it must be also admitted that trellising affords a means whereby this advantage—which in standard trees, or bush vines, is secured by certain

parts—may be minimised and distributed to all with an evenness not possible under any other method of training. This leads us to the expression of the one great principle upon which the most successful trellising of the grape vine

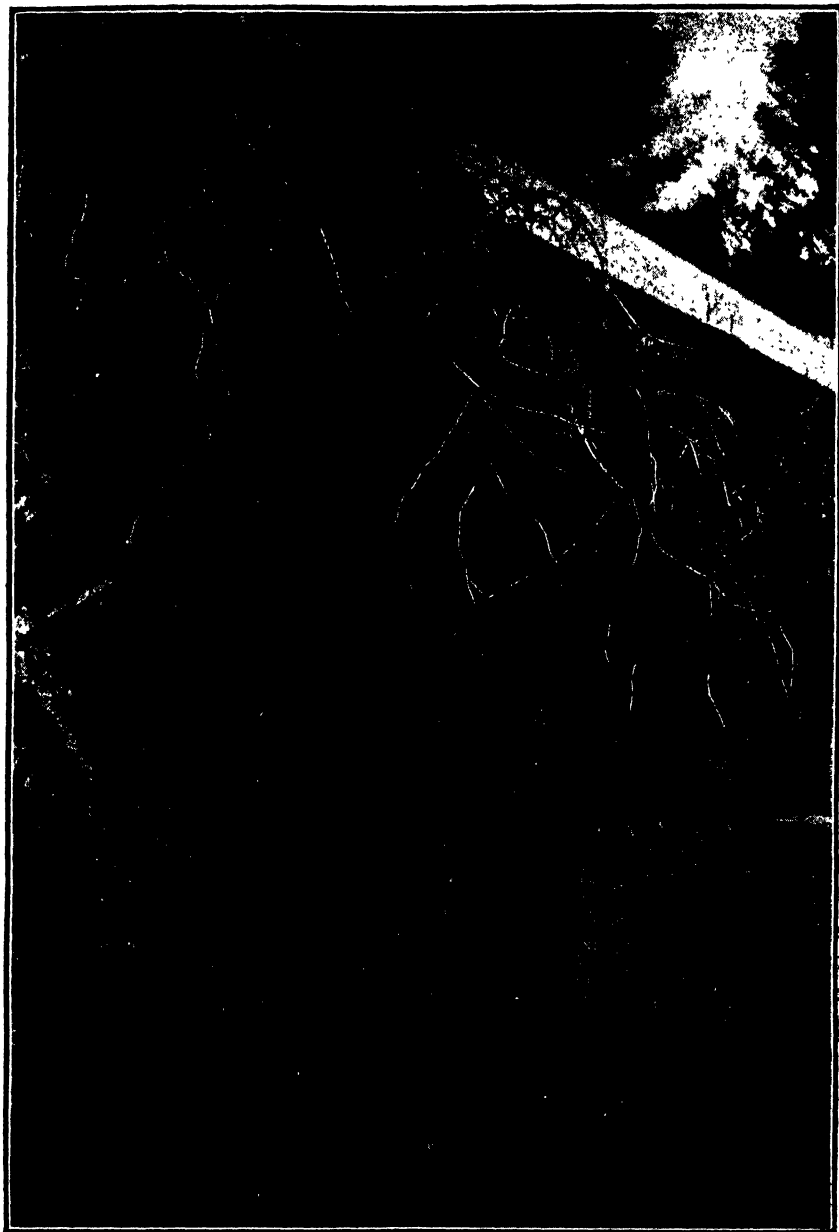


Fig. 16.—A Vine Trellised, but not Systematically Trained. An Ineffective Method of Covering Wall with Vines.

is based, and that is, *the permanent parts of the plant must be so arranged that all annual growths (fruit shoots) may arise from a common level.* This means, therefore, that the permanent arms—if more than one be used—on any given vine shall be trained, not only horizontally, but on the same level above the soil. By most persons who trellis grape vines this is a principle which is either

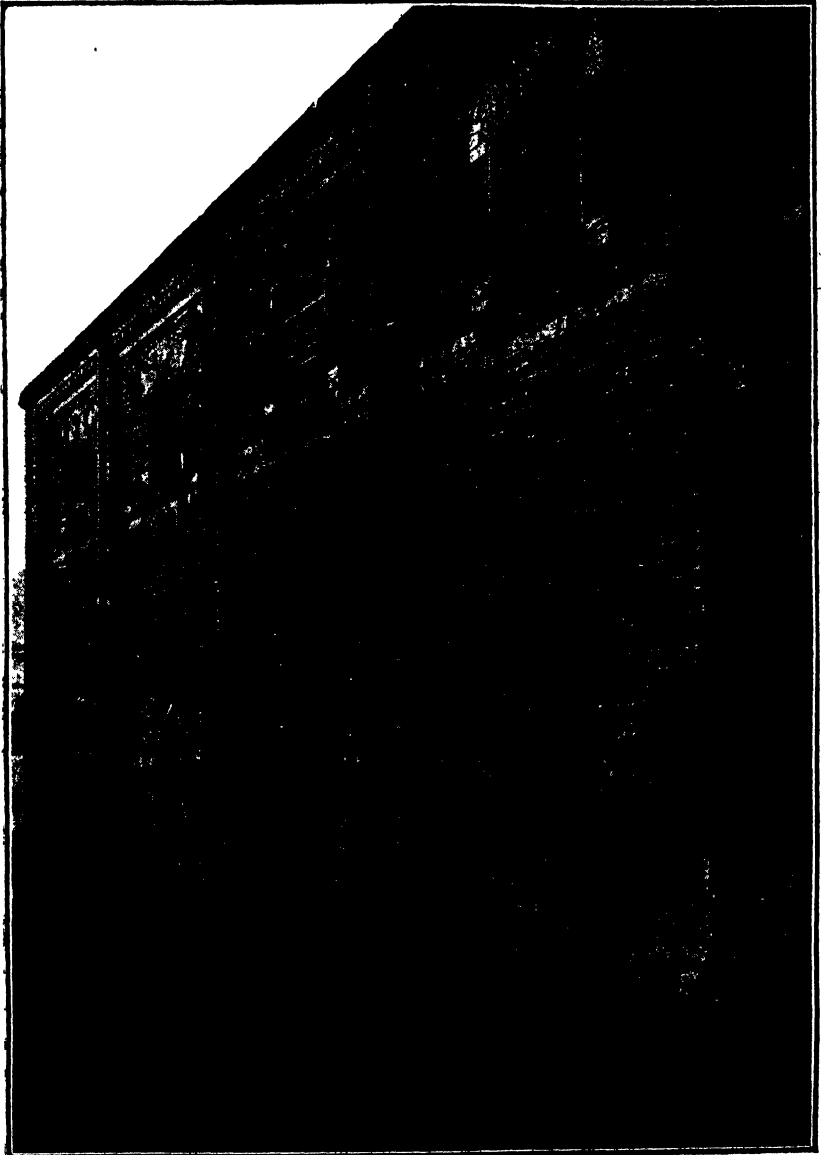


Fig. 17.—A Good Intention Gone Astray.

not fully grasped or is allowed to become overridden by a desire to secure growth and fruit over too large an area in the early stages of training the plant. The trellising depicted in Fig. 17 is a good illustration in point. Here the pruner of a number of the vines evidently started correctly, but had grown "weary in well-doing" and departed from the first principle involved, with the invariable result that the annual growths now arise here and there in haphazard fashion about the trellis, with the ever-increasing tendency to become more and more abundant on the upper branches of each plant as those below are robbed of sap and starved out of existence. This result is not arrived at until a few years after the vine begins to bear. Let it be trained and hacked about never so unskillfully, the natural prolificacy of bearing displayed by the grape vine appears to reward the pruner, and sound the praises of his methods for a time. The day of reckoning, however, is bound to follow in the shape of long naked limbs, crowned with a crop of fruiting wood at the very topmost positions only.

Wherever a high trellis has to be covered, as is attempted in Fig. 17, several tiers of separate vines should be planted in regular series one above the other, so that the permanent arms on any given plant emerge at the same level from their parent stem.

There are points common to all trellised vines, which have been noted already in respect to bush vines, probably the most important being the reduction of overgrown secondary arms per medium of the utilisation of water-shoots.

In training the main arms, experience shows that it is false economy to twist them around wires, as such an act ultimately results in the necessity for removing the wire from the swollen folds of the arm, or constriction of the sap vessels will take place to an injurious extent. The pruner must distinguish between twisting the temporary cane, which is left for fruit production only, and the permanent cane retained for the extension of the main arm. Authorities agree that in no case should spurs or rods be retained which arise within about a foot of the bend or angle made where the vertical stem merges off into the horizontal main arm or arms, as the position is one of considerable advantage for receiving sap, and any such shoot almost invariably robs the growths situate farther along the main arm.

THE SPALIER.

This is the term applied to a trellised grape vine on which a permanent arm is trained out from the stem on each side and in the same plane, each pair—if more than one pair—being on the same level. Some forms of spaliers have several pairs of such arms, each set of which emerges at regular distances along the main stem—one above the other. Owing, however, to the great and constant care required to regulate the activity of vegetation in the arms thus set at varying heights, such a form is not recommended for use, excepting to such persons who may desire to follow the work of trellising purely as a

hobby, and devote considerable time to pinching back shoots in summer. The best and most simple type to follow in spalier training is to permit one vertical stem only and one pair of horizontal arms—be they short or long—to each vine. To attain this end the newly planted vine is, as recommended for the bush vine, pruned back to a single spur of one or two buds, with a view to inducing at least one very strong shoot to arise during the ensuing summer. This shoot should be secured to a stake as it ascends.



Fig. 18.—Forming Bordelais Spalier; Fourth Winter Pruning.



Fig. 19.—Bordelais Spalier (Vine of Moderate Strength).

There are two types of spaliers suggested for use here in Australia, viz., the *Bordelais* or *Bordeaux spalier*, which possesses a pair of extremely short main arms, resembling the prongs of a fork, and the *Thomery spalier* (named after a district near Paris), in which a pair of arms is, with the exception of on a few varieties, permitted to extend much farther away from the parent stem, but in a horizontal position.

The Bordelais Spalier—Figs. 18, 19, 20.—This form has been recommended by our Government Viticulturist (Professor A. J. Perkins) as suitable for adoption in connection with the growth of certain wine grapes which need rod-pruning, such as Pinot, Carbernet Sauvignan, Shiraz, &c., when planted

in comparatively poor soils. This form is suited to a cheap trellis of two wires; and the authority quoted above advocates 12in. to 15in. above the soil as a suitable height for the bottom one, to which the annual fruiting canes or rods are tied, and a second wire about 20in. above the lower one, to support the growing shoots. The type consists of a stem about 10in. high, on each side of which in the direction of the wire is one short main branch bearing each, according to the strength of the vine, either one rod and a spur (Fig. 18), or two rods and two spurs (Fig. 20.)

The vine is trained by pruning to one spur at the second winter season the shoot which arises the first summer after planting, and this at the requisite height to form the stem. The pruner at the same time sees that the two topmost buds are on opposite sides and face the wires. The following summer these two upper buds are encouraged to make good shoots. Next winter both of these are pruned as spurs, with from three to six buds each, thus forming the fork-like main arms, and the resulting growth should give at least



Fig. 20.—Bordelais Spalier (with Four Rods and Four Spurs ; Vine Strong).

two good canes from each arm. One of each of these is pruned to a spur for wood production purposes and the remaining two are made into canes for fruit-bearing in the coming summer (see Fig. 18). *The vine is now formed, and the annual pruning consists of suppressing the previous year's rods, removing all water-shoots and suckers, and converting two shoots of the previous summer's growth to a spur and rod respectively on each main arm ;* or, as previously stated, strong vines may carry two rods and two spurs on each side, as shown in Fig. 20. In all such operations the spur, being reserved for wood production, necessarily regulates the framework of the vine and is in part comparatively permanent in character, whilst the rod is used for a temporary purpose, viz., fruit-bearing. The spur, therefore, to prevent undue extension, should be made from the cane situate lowest down upon the main arm in the direction of the main stem. In the course of time, even with the constant exercise of this precaution, the main arms must become exaggerated in length or impoverished with old scars. The pruner must then use his judgment in securing their renewal by means of suitably placed water-shoots, as described heretofore.

WATTLE GROWING.

PLANTING AND TREATMENT OF SEED.

By WALTER GILL, Conservator of Forests.

The wattle of which particulars are here given is the golden wattle (*Acacia pycnantha*). The black wattle (*Acacia decurrens*) is quite unsuited for the northern and western districts of this State.

REARING WITHOUT CULTIVATION.

The golden wattle is reared in two ways—with and without cultivation—and the treatment of the seed prior to sowing largely depends upon which of these is adopted. On any estate there may be patches of land in open forest country rather too rough for cultivation, and covered with undergrowth, which the owner may decide to use for wattle-growing. The undergrowth on such land must of course first be grubbed, and when the grasstree, hakea, acacia, and other bushes are dry enough to run a fire, wattle seed can be scattered broadcast. The firing of the grubbed bushes and ordinary rubbish usually found in open forest country creates a suitable seedbed for the seed, which at the same time it prepares for germination by cracking its tough skin. Considerable areas of wattles have been successfully developed in this way. The limited number of trees occurring on a good deal of light timbered country are a benefit to the wattles, as they shelter them from frost in winter and sun scald in summer. Some trees could be rung if they were too thick, and would still continue to yield some shelter.

The wattle is a shrub which demands a certain amount of shelter to grow to the best advantage, and, though opinions adverse to this view are held by some, the writer has been informed by one of the most experienced bark buyers in the State that the best bark is usually obtained from wattles grown under the shelter of larger trees. If the undergrowth should be too thin to give a uniform result over the whole area, it may be sown and burnt in patches, and the wattles can either be left to spread gradually, or the clear patches can be filled up by other methods, such as spading in a few seed in patches at about 8ft. distant.

TREATMENT OF SEED FOR CULTIVATED AREAS.

All things considered, the best way to treat seed for sowing on cultivated ground is to place it in a vessel, pour water almost boiling upon it, and leave it to soak for several days. It should then be kept damp in a bag till swelling takes place. It is a good plan to mix sand with the seed, as this avoids sowing too thickly, which is an error generally made, and results in much needless labor in thinning the wattles later on. About half a bushel of sand to the pound of seed has been recommended as a suitable quantity by some; but the individual grower will easily judge of this for himself after a brief trial. The quantity of seed per acre may be half a pound, or thereabouts. It can be obtained from any of the city nurserymen.

CULTIVATION OF THE LAND.

Ploughing the land to a depth of 6 in. or thereabouts is enough, and a good harrowing will prepare it sufficiently for broadcasting the wattle seed, after which it can be lightly covered either by a light set of harrows if the land be rough, or by brush harrows if sandy, as the seed only needs covering about an inch.

The Forest Department has lately secured remarkably good results in rough ironstone country in the Kuitpo Forest, Meadows district, by broadcasting in a new plantation, over land just roughly ploughed with a stump-jump plough in the usual way for tree-planting; showing that excessive care is not needed if conditions are suitable.

TIME FOR SOWING.

The seed may be sown during the winter months in light warm soils, but in heavier land, especially when the soil gets constantly saturated and thus kept in a cold state, sowing should be left till early spring warms the ground.

SUITABLE CONDITIONS.

The golden wattle requires a fair rainfall and good ironstone country to produce the best bark. The ironstone country in the Mount Lofty Ranges is unsurpassed in its capacity for producing the best bark which comes into the Adelaide market. As a rule limestone country does not suit the golden wattle, and a great deal of poor sandy country, though it will grow wattles of fair size and imposing appearance, will not grow bark containing sufficient tannic acid to pay stripping and cartage and yield a profit.

POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR AUGUST.

HATCHING.

This month should see the bulk of the heavy breed hatching in full swing. As a rule, except for competition breeding, the middle of September is late for the heavy breeds. August may be looked upon as the busy season for all breeds, as many only begin hatching the light breeds at this time.

Broody Hens.—Before allowing these to sit upon eggs they should be well dressed with insect powder in order to destroy all vermin. Do not use kerosine, oil, or any strong-smelling substance, as their use will prove fatal to the embryo. It is better to remove a broody hen or turkey at night. Invert a box (ventilated) over the nest so as to keep the hen dark for a day or two, so that she may settle down.

The Nest should be made upon the ground, as in that position there is less evaporation of the contents of the egg. Of course, many successful hatches take place where the eggs are on a wall or in suspended nests. The ground, however, has been proved to be the proper place. Make a shallow depression and line it with clean short straw or dry grass. Do not give the hen too many eggs—less in cold weather than when it is warmer. Wash all dirty eggs and mark them in ink. Make a record of date when set, number of eggs, and any other particulars, such as breed, strain, pen number, &c. Examine the nest frequently, and if an egg is broken, remove the debris and sponge any soiled eggs with clean warm water and dry with a clean soft cloth. Apply insect powder to both hen and nest as required.

Testing the Eggs.—From the fifth to seventh day the eggs may be tested to ascertain if they are fertile. The simplest method is as follows :—In the centre of a piece of cardboard measuring about 8 in. square, cut out an egg-shaped hole, rather smaller in size than an average egg. Procure an ordinary “Bismarck” reading lamp without shade and attachments. Carefully remove, at night, all the eggs from under the hen and place in a warmly-lined basket (an old felt hat is excellent). Hold each egg in turn tightly against the hole in the cardboard and then close to the lamp. The light, not intercepted by the cardboard, passes through the egg. If infertile, the egg will appear clear; if fertile, the small embryo will be clearly visible, and generally has the appearance of a small-bodied, long-legged, reddish spider; frequent undulating movements may be observed. Should a ring of red appear it is a sign of rupture. If a black spot be noticed, without any

free movement, it is a dead germ. These eggs can be discarded. The clear infertile eggs are quite good for cooking, there is no life in them; in fact they are superior to the average egg which is only marketed from the farm once a fortnight and arrives at your table a fortnight later. Return the fertile eggs to the hen without undue delay, so that they are not chilled.

Incubation.—Hen's eggs take from 20 to 21 days to incubate; duck's eggs from 27 to 28 days. The sitting hen should not be disturbed at all about hatching time. The beginner is often anxious to know results, and any interference will worry the hen, who at this time is in an anxious frame of mind. If undisturbed the hen will, as a rule, bring off a good clutch and will remove them when the proper time arrives.

Feeding and Water.—Feed sitting hens on grain, but do not feed them on the nest. Provide a receptacle of clean fresh water near at hand, as sitting birds are frequently thirsty. They should always be encouraged to leave their nests daily. They can then feed, dust themselves, &c., and the eggs are also aired. In mild weather a hen may safely leave her eggs exposed for an hour or more. Provide, in a dry corner, a dust bath of dry dust and wood ashes.

THE INCUBATOR.

There are several reliable incubators on the market. Breeders will be well advised if they follow carefully the instructions issued by the makers.

Incubator-room.—Any well aired room or cellar will do for an incubator to stand in. It is a bad practice to have them in living rooms where there is a fire by day and none during the late hours of night and early morning, as there will be great variations in temperature. A cheap and satisfactory room can be built underground, half underground, or overground. It may be built of hardwood slabs and the roof covered with earth a couple of feet in thickness. Ventilate the roof with an exhaust pipe fitted with a "Hit-and-miss" ventilator. A hard earthen floor will do. More elaborate structures can be erected if desired.

ESSENTIALS TO SUCCESS.

The Eggs.—Let your aim be to hatch only those eggs which are laid by proved hens, whether as layers, for exhibition, or for table. Reject all oversized and all very small eggs, and also those which have rough or misshapen shells. Wash in clean water and dry with a clean cloth any dirty-shelled eggs.

The Thermometer.—Much loss and disappointment occurs through the use of faulty and incorrect thermometers. The modern rage for the cheap generally ends in acquiring the nasty. Have your thermometers tested by a reliable man.

Lamps and Kerosine.—The lamps should be cleaned each day and filled to about seven-eighths of their capacity. Use only the best brand of kerosine, and keep the wick carefully trimmed so that a slightly rounded flame results.

Air and Moisture.—The eggs should be turned each day, morning and evening—it is not necessary to turn them exactly half round. Eggs in a tank machine require longer periods of airing than those in a hot air machine. In tank machines, fill the water pans from the start. In dry weather or during long continued dry frosty weather, a wet sponge should be placed under the egg tray in hot air machines.

Dry the Chicks.—Leave chicks and ducklings in the machine until quite dry; on removal keep them warm for at least 30 hours, and do not feed.

FOODS AND FEEDING.

Poultry-breeders would do better, in many cases, if they paid more attention to this subject. In the majority of cases the birds get but little variety, and consequently become stale. Space does not admit of lengthy explanations. The average poultry owner in this State gives his poultry a feed of wheat twice a day and lets them forage for the balance. The average fancier or utility man gives mash in the morning made of bran and pollard, greenfood midday, and wheat at night. Here there is little variety. All cereals are deficient in mineral salts, which are of the utmost importance in feeding poultry. Bran and pollard are both mill by-products of wheat, and with these in the morning and wheat at night there is no variety, although it is better than wheat only. As an egg producer wheat varies according to its composition. Bran and pollard contain many of the valuable food elements rejected in the process of milling flour. Wheat is deficient in fat. Oats are, when wellgrown and plump, excellent for fowls, especially in winter. They contain more fat and less starch than wheat. Oats may be fed freely. Barley is only useful as a change. Barley meal and ground oats are excellent for fattening table poultry. Peas are rich in protein or flesh-making compounds, but are poor in fats. They are, however, excellent for occasional winter use. Maize is generally too expensive to use, but as it is rich in fats it can be used to great advantage in the cold weather and as an agreeable change of grain.

An abundant supply of greenfood, such as rape, kail, lucerne, mustard, &c., should be provided, as from these are obtained the valuable mineral salts, &c., lacking in grain. Give as much variety as you can as regards the grain portion.

The mash should be made of bran, one part, scalded with hot water or hot meat meal soup, and allowed to stand for 20 minutes; then add twice as much pollard, and rub the bran dry with this until you have a crumbly, flaky mass. Mix the mash with the hands—this is the key to successful feeding. Feed the mash in clean earthenware or enamelled dishes; do not throw it upon the ground.

Scatter the grain in clean straw, so that the birds must scratch and work hard to obtain a share. The exercise keeps them warm, healthy, and occupied.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended July 31st.	Total Eggs Laid from April 1st, 1912, to July 31st.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Cowan Bros., Burwood, N.S.W.	130	419
Tabuteau, J. O., Black Rock, Melbourne	93	305
Hodges, H., Pymalong, Victoria	104	268
The Range Poultry Farm, Toowoomba, Queensland	106	308
Brundett, S., Moonee Ponds, Victoria	88	299
Jessup, W. C., Caulfield, Victoria	74	303
Dawes, J. H., Granville, Sydney	99	391
Beadnall Bros., Gawler	107	406
Redfern Poultry Farm, Caulfield, Victoria	71	179
Kerr, R., Longwood, S.A.	115	365
Eckermann, W. P., Eudunda	116	315
McNab, J. A., Sandringham, Victoria	86	285
Mazey, P., Alberton	103	232
Broderick, P. J., Gawler	115	268
Redfern Poultry Farm, Caulfield, Victoria	83	270
Braund, J. E. and H. J., Islington	87	207
Dunn, L. F., Keswick	72	283
Hocking, E. D., Kadina	65	258
Groom, E., Peterhead	83	284
Pope, R. W., Heidelberg, Victoria	76	359
Haines, T. F., Fullarton Estate	29	177
Provis, W., Eudunda	70	249
Burton, W. S., Moonta Mines	74	262
Broster, G., Mallala	75	235
Brain, J. H., South Yan Yean, Victoria	38	272
Sargenfri Poultry Yards, East Payneham	85	370
McKenzie, H., Northcote, Victoria	110	322
McDonnell, J., Greytown, Rosewater	96	347
Browne, A. R., Hawke's Bay, N.Z.	112	356
Brain, J. H., South Yan Yean, Victoria	86	204
Marsson, C., Welland	67	161
Hutton, C., Parkside	84	255
Miels, C. & H., Littlehampton	93	210
Moritz Bros., Kalangadoo	85	523
Codling H., Mitcham Park	48	189
Troughbridge Poultry Yards, Edithburg, Y.P.	101	252
Irvine, A. W., Epsom, Auckland, N.Z.	77	272
Walker, P., Hicksborough, Victoria	68	265
Lampe, B., Kadina	61	119
Waite, F. J. O., Nailsworth	86	342

ROSEWORTHY EGG-LAYING COMPETITION -Continued.

Competitor.	Eggs Laid for Month ended July 31st.	Total Eggs Laid from April 1st, 1912, to July 31st.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS.		
Badeock, G., Mile End	61	182
McClelland, A., Mordialloc, Victoria	85	205
Tomlinson, W., Clarence Park	83	243
Roberts, L. I., Kadina	42	213
"Strathcona," Long Plain	97	259
Whitegate Poultry Farm, Deepdene, Victoria.....	90	285
Purvis, Miss Gracie, Glanville	70	291
Padman, A. H., Hyde Park	69	325
Sickert, P., Clarence Park	88	286
Purvis, W., Glanville	86	278
Rice, J. E., Cottonville	115	368
Hamill, H., Kogarah Bay, Sydney	85	210
Gurr, W. E., Kapunda	86	255
McLeish, E., North Adelaide	73	200
Craig Bros., Hackney	107	284
Uren, Mrs. P. A., Kapunda	121	453
Perry, Wm., Murrumbidgee, Victoria	73	246
Nancarrow, J. T., Port Adelaide	55	189
Bertelsmeier, C. B., Clare	79	304
Tockington Park Poultry Farm, Grange	106	348
Trenwith, T. H., Kadina	41	152
Knappstein & Bray, Clare	55	149
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	75	239
"Denebollow," Caulfield, Victoria	75	247
Hill, Chas., Monarto South	35	148
"Islay," East Malvern, Victoria	49	204
Cosh, A. J., Burnside	81	301
Indra Poultry Farm, Freeling	58	195
Whitow, A. J., Knoxville	84	290
Hall, T. C., Rose Park	120	324
Ontario Poultry Farm, Clarendon	47	263
Howlett, H., Moonba	63	209
"Koonoowarra," Enfield	101	387
Hall, A. W., South Oakleigh, Victoria	64	323
Convent of the Good Shepherd, Oakleigh, Victoria	76	193
Carne, E. A., Kangaroo Flat, Victoria	51	255
Navan Poultry Farm, Minlaton	43	183
Lillywhite, R. G., Fullarton	69	268
Gibbs & Pine, Queenstown	45	119
Hughes, J. J., Elsternwick, Victoria	83	150
Shamrock Poultry Farm, Perth, W.A.	59	190
Bertelsmeier, C. B., Clare	85	202
Nancarrow, J. T., Port Adelaide	100	257

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Robertson, F. H., Northam, W.A.	48	162
McKenzie, E., Northcote, Victoria	46	183
Mitchell, B., Bendigo, Victoria	63	153
Provis, W., Eudumra	70	164
Kenway, D., West Pennant Hills, Sydney	115	283
Cowan Bros., Burwood, N.S.W.	114	369
Kenmore Poultry Farm, Dandenong, Victoria	34	82
Brundett, S., Moonee Ponds, Victoria	83	179
Cant, E. V., Richmond	79	187

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended July 31st.	Total Eggs Laid from April 1st, 1912, to July 31st, 1912
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SECTION II.—HEAVY BREEDS—*Continued.*BLACK ORPINGTONS—*Continued.*

Craig, Mrs. C., Hackney	68	158
Lampe, B., Kadina	43	165
Wirraparinga Poultry Yards, Plympton	44	178
Phillips, A., Portland, S.A.	59	114
Martin, B. P., Unley Park	114	276
Nancarrow, J. T., Port Adelaide	80	105
Padman, J. E., Plympton	47	273
Francis Bros., Fullarton	61	102
Hall, T. C., Rose Park	57	246
Tockington Park Poultry Farm, Grange	66	133
Bertelsmeier, C. B., Clare	92	227
Craig Bros., Hackney	82	277
Bertelsmeier, C. B., Clare	89	178

SILVER WYANDOTTES.

Dunn, L. F., Keswick	119	234
Tidswell, H. J., Mitcham Park	90	322
Moyses, S., Blyth	38	165
Perry, Wm., Murrumbidgee, Victoria	76	148
"Deneshollow," Caulfield, Victoria	98	227
Western, F. C., Marion	106	337

SALMON FAVOROLLES.

Courtenay, K., Mordialloc, Victoria	75	257
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LANGSHANS.

Stevens, E. F., Littlehampton	76	264
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PLYMOUTH ROCKS.

"Koonoowarra," Enfield	43	96
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SECTION III.—SCRATCHING SHED SECTION.

WHITE LEGHORNS.

Sickert, P., Clarence Park	95	302
Tomlinson, W., Clarence Park	96	362
Moritz Bros., Kalangadoo	35	230
Codling, H., Mitcham Park	62	230
Sargenfri Poultry Yards, East Payneham	64	240
Purvis, W., Glanville	77	262
Bertelsmeier, C. B., Clare	72	278
Padman, A. H., Hyde Park	67	241
Hocking, E. D., Kadina	37	196
Beadnall Bros., Gawler	74	185
Brain, J. H., South Yan Yean, Victoria	49	135
Provis, W., Eudunda	57	267
Redfern Poultry Farm, Caulfield, Victoria	76	300
Broderick, P. J., Gawler	72	170
"Koonoowarra," Enfield	53	149
Lillywhite, R. G., Fullarton	52	214
Cosh, A. J., Burnside	54	219
Indra Poultry Farm, Freeling	47	204
Whitrow, A. J., Knoxville	72	215
Tockington Park Poultry Farm, Grange	59	263

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended July 31st, 1912.	Total Eggs Laid from April 1st, 1912, to July 31st, 1912.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	104	370
Dow, A., Glencoe West	113	386
McNamara, Mrs., Mount Gambier	100	275
Moritz Bros., Kalangadoo	124	467
"Mahama," Mount Gambier	112	323
Holmes, F. A., Frances	103	355
Sudholz, A., Kalangadoo	103	260
Staunton, S., Naracoorte	64	246
Hall, C. W., Mount Gambier	98	313
Moritz Bros., Kalangadoo	85	389
Vorwerk, K. E., Millicent	119	314
Vorwerk, H. F. & A. C., Millicent	101	334
Jarrad, J., Mount Gambier	96	271
Bartram, T. A., Kybybolite	115	399
Vorwerk, H. F. & A. C., Millicent	82	297
Jenkins, R. D., Kybybolite	69	186
Arthur, J. S., Bordertown ..	76	315
Drake, C., Naracoorte	96	324
"Eurinima," Kybybolite	118	356
Smith, M., Hynam	116	300
Lacey, F. C., Kybybolite	136	493
"Herdfield," Mount Gambier	123	482
Blue Lake Poultry Farm, Mount Gambier	82	244
Beaton, W. J., Tantanoola	99	292
Bonnett, E., Kalangadoo	93	175
Jones, H. F., Mount Gambier	89	208

MINORCAS.

James, S. T., Mount Gambier	43	97
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdfield," Mount Gambier	99	223
Blue Lake Poultry Farm, Mount Gambier	84	216
McNamara, Mrs., Mount Gambier	44	124

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	56	238
Osborne, W. F., Kalangadoo	103	268

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	13	15
Glenelg River Poultry Farm, Mount Gambier	34	106

NOTES ON EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

The month of July is always a time of great anxiety in connection with laying competitions. The weather is the controlling factor, and this year it has been more trying than usual. From the end of July onwards steady progress and good laying may be expected until the crucial time arrives when the merits of any particular pen of birds receives its test. Well-bred, well-reared pullets will continue to yield a satisfactory supply of eggs, the lesser lights will fail. It is too early to say more than that the prospects of fine general averages are promising.

ROSEWORTHY.

The Superintendent reports—The general condition of the birds is good, and nearly all have that bright appearance we are so anxious to see after the critical period which is usual during the months of June and July. Some few of the birds are in a light moult. These instances occur as individual ones in different pens, and consequently are to be regretted more so than if the whole of the birds in such pens were in moult. In the latter case it could be the better understood, but where the birds moult one at a time at different intervals, extending over a period of four months, it is very difficult to follow the system of breeding and selection adopted by some breeders. While this system is continued it will be impossible to obtain even fair weekly scores from pens so selected; but while the general averages could be improved upon, largely by improved methods of selecting the layers, it is pleasing to note that the laying has been fairly well maintained, although on a lower level than is desired. The number laid during July was as follows:—Section 1, light breeds, 6,661; section 2, heavy breeds, 2,283; section 3, scratching sheds, 1,270. Through some reason which has not yet been determined, a serious falling off occurred during the month. Section 2 has produced 22 broodies. The health of all the birds has been good; no deaths occurred. The temperatures for the month have been as follows:—Average maximum, 51.1°; average minimum, 35.7°. Rainfall, 1.68in. There was wind on 27 days; a feature of this was that it blew from the north-west on 13 days and from the north-east on nine days.

KYBYBOLITE.

The Superintendent reports—The general health has been good; no deaths occurred, though there were a couple of cases of cramp. The laying has been good, with a slight falling off towards the end of the month. This is due no doubt to the frosts and cold. Total eggs laid were—Section 1, 8,421; section 2, 1,190. Out of 11 days we had seven frosts. The minimum temperature was 28°, with a maximum of 60°. Wind was registered on 20 days, many of which were very cold.

D. F. LAURIE, Poultry Expert and Lecturer.



GARDENING IN THE HILLS.

THE VALUE OF LIME.

(Lecture by the DIRECTOR OF AGRICULTURE.)

The Director of Agriculture (Mr. Wm. Lowrie, M.A., B.Sc.) recently addressed the members of the Campbelltown Branch of the Fruitgrowers and Market Gardeners' Association on various essentials connected with market gardening, and emphasized the value of lime as a means of increasing the fertility of the soil. In the course of his remarks he pointed out that the market gardener depended largely for his measure of success on the quality of his produce. Forethought in planning and carrying out a scheme to have garden commodities ready a little earlier or a little later than the period at which the market was glutted, brought its own reward; but quality was always an essential factor in securing readiness of sale, and the best prices available at the time. Heavy yields had an important bearing on the commercial success of the grower, but excess of bulk was frequently largely discounted through lack of quality. Thus it was necessary for the gardener and fruit-grower to aim at the production of the heaviest yields combined with highest quality.

Factors which made for this ideal were—(1) The careful selection of seed and of the most improved varieties of plants and trees suitable for the climate and the special purposes in view; and (2) the thorough, systematic, and intelligent tillage amendment and manuring of the land. The value of fertile market gardening land within easy reach of the markets was high, so that it was incumbent on the occupier to make it yield to the fullest capacity consistent with the maintenance of soil fertility. And this could only be accomplished by husbanding resources, and by the application of controlling factors such as those which conduced to the continuous vigorous activity of plant life during the period of growth. Any check, or series of checks, from excess or lack of moisture, imperfect tillage, and injudicious manuring, affected the ultimate yields, and told its tale in the range of quality. The market gardener was, or should be, the master of an art—he was the apostle of intense culture—and he was bound to force the pace or fail in competition; or, if owner of the land, be satisfied with less returns than his property was capable of producing.

THE NEED FOR LIME.

The value of lime as a means of increasing the fertility of the soil had almost completely been lost sight of; yet it was a most important factor in ensuring the greatest success on some of the areas in that district, and over the major portion of the market gardening land in the hills, where the rainfall was heavier. Those who broke up the rich alluvial flats in the first place found a wealth of fertility. As a consequence they had been able to go on cropping the land for many years without feeling the need for lime. That time had now arrived, and the sooner the position was realised the better it would be for the land and for the pockets of the producers. Growers, anxious to get the heaviest crops in the quickest time, had dressed the land heavily with stable manure season after season.

They had, however, apparently failed to realise some fundamental facts. Before the benefit of the fertiliser could be obtained it was necessary that it should decompose. That process proceeded through the agency of nitrifying ferments—microscopic organisms. If the conditions were favorable, these ferments performed their work of disintegration rapidly, but if the conditions were unfavorable the decomposition was not effected to anything like the same degree, and there remained in the soil organic acids which made it sour. As a rule, sour land was considered to be wet, cold land, which had become waterlogged and was difficult to aerate.

In the case of the market gardeners, they might have good under drainage and work their land thoroughly and frequently, but if they failed to put into the soil the elements which ensured the continuous and proper activity of the nitrifying ferments they must expect it inevitably to become sour. The farmyard manure applied did not yield up its nitrogen through decomposition sufficiently quickly unless stimulated by lime.

The use of lime was one of the means, the most ancient, of improving the fertility of land; but with so much attention being given to phosphates, this traditional amendment had been overlooked. "Lime sweetens the soil," was a trite saying, but a true one. But lime did more than that. It undoubtedly helped materially to make stiff land more porous and open, but that was only one of its influences.

Another equally, if not more important influence, was that it increased the activity of the nitrifying ferments. It was also a means of supplying indirectly potash to the land. These did not represent all the benefits derived from the use of lime, but they were sufficient to justify him in directing their attention to it and strongly urging them to give it a thorough trial.

They must not expect any much resultant good in the first year. Time was required for the lime to do its work, and it might be two, three, and even four years before they would see the full effects of a dressing. Lime offered a base for nitric acid, formed in the soils as the product of ferment activity, and generally it neutralised acidity of soils, producing most favorable

conditions for ferment and plant life. It was, therefore, a desirable soil stimulant where heavy rain and continuous cropping had leached most of the lime out of the land. It was a matter of primary importance to gardeners to replenish supplies, and the reason this had not already been generally done was probably partly due to the relatively high cost, and the common belief that it was useful only for ameliorating the physical texture.

FREQUENT DRESSINGS PROFITABLE.

Supplies at a reasonable figure were now procurable from merchants, who had awakened to the knowledge that there must come a good demand for agricultural lime in certain districts. Quicklime (not carbonate of lime) could be purchased at 23s. 10d. a ton, bags extra; and lime ash, which contained about 70 per cent. of lime and 30 per cent. of wood ash and sand, at 1s. 6d. a bag. Hydrated lime was quoted at 2s. 3d. a bag, on trucks. He contended that it would pay well to apply frequent dressings of lime at those prices.

It was worth bearing in mind that part of the super. or other phosphates, especially soluble phosphates, which they introduced to the soil, were bound up fast and insolubly in the form of phosphate of iron and phosphate of alumina. The iron seized upon the phosphates, entered into combination with them, and formed an insoluble salt. There was no better method of breaking up that combination and of getting the benefit of the plant foods contained in it than by the utilisation of quicklime. If there was a deficiency of lime in the soil it was utterly impossible to reap the utmost advantage from the artificial and other fertilisers. Weight for weight, quicklime, of course, was the best to apply, because there was more lime in it. There was the same amount of calcium oxide in 56lbs. of quicklime as there was in 160lbs. of carbonate of lime.

SEA SHELLS FROM KANGAROO ISLAND.

Some experiments were being carried out with shells from the Spit, near Kingscote, Kangaroo Island, and he believed these would prove so successful that they would lead to a great demand of available supplies for use in orchards and gardens where lime was required. Samples of the shells, when analysed, had revealed 94 per cent. of carbonate of lime, equal to about 5 lbs. of quicklime. Supplies of the shells could be secured for 13s. a ton, compared with 26s. a ton for quicklime. By acting in co-operation the producers could purchase an oil engine and crushing plant for, say £300, instal it on the Spit, and have the shells crushed there before forwarding. The shells could be applied to the land as they were, but their action would be much more rapid if they were first crushed to powder.

Of course, if the price of quicklime fell to £1 a ton there would not be any need to go to Kangaroo Island for sea shells, and as things were the limeburners

had a good case, but he doubted, however, whether there could be such an appreciable lowering of price as that, in view of the costs to the burner.

THE QUANTITY TO APPLY.

A fair dressing of lime would be about one ton of quicklime per acre, or, say, two tons of shells per acre. However, applications of 5cwts. to 7cwts. of quicklime at frequent intervals would meet requirements probably, if one heavy dressing had been applied in the first instance. For all-round general usefulness gypsum was far behind carbonate of lime. As a means of opening up the soil its value was relatively small, and it was not comparable with quicklime as an agency in increasing the activity of the nitrifying ferments.

In laying out an orchard the tilling and all other essential work should be done with absolute thoroughness right from the start. He would not advise putting lime in the holes when planting trees, but it would be well to work some in periodically on the surface afterwards, as it would undoubtedly induce the roots to lead out. Like potash, lime increased the sweetness of a lot of the fruits, especially oranges, and made them more palatable.

UNDER DRAINAGE.

He advocated under drainage as a means by which increased returns might be obtained from such market gardening land as became water-logged and spuey in winter. It was well known that crops grown on such land were the first to show the effect of dry conditions during the summer. Paradoxical though it sounded, the removal of the excessive moisture in the winter would result in the better retention of moisture in the summer. The existence of under-drains allowed the water to go down, and as it percolated through it was followed by the air. Thus, the soil was aerated, and deeper rooting habits were cultivated. When the soil was water-logged air was excluded, and roots remained near the surface, to feel the pinch of the first dry spell.



VINEYARD PRODUCTION, 1911-12.

The Government Statistician has issued the official return of the yields of the vineyards of the State for the past year. It was expected that the dryness of the season would seriously affect the vintage, but it is satisfactory to report that while there is a decrease of 548,461 gallons, or 16 per cent., on the previous vintage, the average for the last five seasons has been exceeded by 90,460 gallons. The yield was 2,921,597 (3,470,058) gallons. A large quantity of the wine annually made is afterwards distilled for the production of brandy.

STATEMENT OF AREA AND PRODUCTION OF VINEYARDS FOR THE FIVE SEASONS, 1907-8 TO 1911-12.

Seasons.	Total Area (Bearing and not Bearing).	Grapes Gathered.		Wine made.	Currants Dried.	Raisins Dried.
		Total.	Average per Acre of Bearing Age.			
	Acres.	Tons.	Tons.	Gallons.	Cwts.	Cwts.
1907-8	21,080	26,005	1.34	2,061,987	19,958	21,488
1908-9	22,031	34,697	1.73	3,132,247	24,449	28,007
1909-10	22,441	31,040	1.52	2,569,797	36,052	27,808
1910-11	22,952	36,861	1.81	3,470,058	40,261	34,745
1911-12	23,986	34,591	1.67	2,921,597	46,695	31,651
Average for five seasons	22,498	32,639	1.62	2,831,137	33,483	29,940

EXPORTS OF WINE.

A substantial export trade in wine and brandy made from wine is carried on with the other Commonwealth States; but as it is not recorded, the following statement is confined to the exports to countries beyond the Commonwealth.

Wine.	Exports for Years —				
	1907.	1908.	1909.	1910.	1911.
Gallons	353,381	320,438	520,269	449,673	585,603
Value £	35,989	32,631	53,325	48,114	66,617

VALUE OF PRODUCTION.

The following statement shows the estimated value of vineyard production (grapes for table, currants, raisins, and wine made) for the seasons 1907-8 to 1911-12 and the percentage of value to total value of all crops, and the average value per acre of vines of bearing age.

Seasons.	Total Value.	Value of Vineyard Production.	
		Percentage to Total Value of all Crops.	Value per Acre of Vines of Bearing Age.
	£	£ s. d.	£ s. d.
1907-8	384,344	5 19 3	19 15 11
1908-9	403,153	5 13 3	20 2 5
1909-10	398,426	5 6 10	19 11 6
1910-11	585,285	8 2 1	28 14 9
1911-12	578,504	7 11 7	27 18 10
Average five seasons	469,942	6 11 0	23 5 10



EXTRACTS FROM TRADE COMMISSIONER'S REPORTS.

The following is an extract from the Trade Commissioner's Report, dated London, June 14th :—

BRITISH DAIRY FARMERS' SCOTTISH TRIP.

At the invitation of the above body, I joined them in a tour of inspection of the leading stud stock farms, butter and cheese and margarine factories, experimental farms, and abattoirs, situated in the various parts of Scotland.

DAIRYING.

In the part of the country we visited one could not help being impressed with the almost general use of the Ayrshire breed of cattle for milk producing. This type of cattle is being built up to a much bigger and heavier boned beast than we know in Australia, by systematic breeding. Different counties, however, favor other breeds, and during the tour, herds of Galloway, Aberdeen, and Shorthorns were inspected. The first-named breed is an exceptionally fine carcass beast.

Cheese-making is carried on very extensively, as well as the sale of milk direct to the large towns. The climatic conditions are such that cheese can be cured without resorting to artificial means. The turning shelves employed in curing-rooms are ingeniously constructed, and economise excessive handling.

I was disappointed in the arrangements of many of the butter and cheese factories; for, whilst cleanliness and sanitation in almost every instance could not be improved upon, there appeared to be a general disregard for labor-saving methods from the delivery of the milk and its treatment afterwards. I was also surprised to find that margarine-making is now being developed on a much larger scale.

COW TESTING.

The most striking feature of the whole trip was the methodical manner with which each individual cow is tested, both for quantity and quality of the milk produced. In 1903 the system was first tried on 34 herds of 1,342 cows, and so satisfied were the owners of the different herds of its advantages that this year on 435 herds of 18,000 cows they have adopted testing.

It has been found by systematic testing, extending over 34 herds, that the average of the best cow was £14 10s. 10d., whilst that of the worst cow was £7 14s. 7d., both animals costing the same amount in upkeep. The Highland Agricultural Society have a staff of testers, who travel around the various dairies, and superintend the testing at different periods, and enter the records in a book kept by the owner, which is carefully inspected by the prospective buyers, and the price offered is based upon the milk records of the cow intended for sale.

ABATTOIRS.

Glasgow and Edinburgh have both recently constructed new buildings for this purpose which I was able to thoroughly inspect. However, the coolness of the climate, method of dressing, and quietness of stock make the local conditions so entirely opposed to those that apply in Australia, that a comparison is almost impossible. One feature is predominant, however, and that is the cleanliness, and the facilities in construction to aid it. The overhead trolleys and hoists are the best I have seen anywhere. Prior to the construction of the Glasgow abattoirs, a deputation of butchers, councillors, and superintendents visited the main abattoirs of the Continent to formulate ideas in construction; and consequently I noticed several continental devices embodied in the general scheme.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, July 10th, there being present Messrs. A. M. Dawkins, G. R. Laffer, J. Miller, F. Coleman, G. F. Cleland, C. E. Birks, T. H. Williams (Chief Inspector of Stock), C. J. Valentine, G. Jeffrey, Professor Lowrie, Professor Perkins, and G. G. Nicholls (Secretary).

ELECTION OF OFFICERS AND WELCOME TO NEW MEMBERS.

On the motion of Mr. Laffer, seconded by Mr. Cleland, Mr. A. M. Dawkins was unanimously re-elected Chairman for the year.

The Chairman welcomed Messrs. F. Coleman and C. E. Birks, who had been appointed members of the Board by the Minister since the last meeting.

On the motion of Mr. Miller, seconded by Mr. Valentine, Mr. G. R. Laffer was unanimously elected Vice-Chairman.

SEA SHELLS FOR LIMING.

Professor Lowrie produced for inspection samples of sea shells obtained from the spit at Kingscote, which had been recommended for use in liming soils. Mr. Birks said that there was a deposit of similar shells, ranging from 100yds. to half a mile wide, and from 5ft. to 20ft. deep, extending from Port Broughton almost to Port Pirie. The shells were in layers, and could be handled without difficulty. He was wondering whether it would be possible to convert the shells into quicklime by burning. If so, there was an abundance of wood available for the purpose. Mr. Laffer mentioned that about 1,000 tons of shells a year were removed from the spit for use in the pottery works, and the smelters also used them. Mr. Birks added that the smelters had taken large quantities of shells from the deposit to which he had referred, but, owing to the introduction of a new process in smelting, had discontinued the practice. At the instance of Mr. Miller, Mr. Birks promised to obtain three samples of the shells for analysis.

VETERINARY CLASSES.

The Secretary reported that the Minister of Agriculture proposed to establish short courses of lectures on the treatment of stock in health and disease at various centres in the State. With that in view, the Director had forwarded circulars to the different branches, explaining that "before proceeding to organize a scheme, or make an appointment of a lecturer, he wishes to know how many of the Bureaux would be prepared to establish such classes. The conditions proposed were that at least 20 farmers or their sons shall be enrolled

at each centre before the services of the veterinary lecturer will be available. The arrangements for the lectures will be made by a local committee or the Agricultural Bureau. A fee may be charged by the committee to pay for hall and light, but should not exceed a few shillings. After each lecture an opportunity will be given to the farmers to ask questions pertinent to the address, and a day will be devoted at each place following each lecture for the officer to give demonstrations on such subjects as the treatment of wounds, the administration of medicine, and the diagnosis of the more common ailments. The lectures will be given on one night each week for four weeks, and the lecturer will have two places to attend and at which to lecture each week. In the northern areas the four lectures will be on the common ailments of horses, and in the dairying districts two will be on those subjects and two will deal with diseases of cattle." Members of the Board thought the idea an excellent one.

NOXIOUS WEEDS.

The Secretary reported that the recommendations made by the Board at the previous meeting in respect to the destruction of noxious weeds had been sent to the Minister of Agriculture. Cabinet had now decided that the matter could not be settled until the subject was recommended by the local governing bodies. Mr. Laffer said that this would mean, evidently, that things would go on in the present slipshod manner for all time. Mr. Coleman said it seemed that the matter should be referred to the District Councils Association, which, he considered, had not manifested the keen concern in the subject that it might have done. Mr. Laffer pointed out that the recommendations were the outcome of a resolution agreed to at the Farmers' Congress, and had been invited by the Minister of Agriculture. "Now," he continued, "they say nothing can be done without an expression of opinion from the district councils." Mr. Jeffrey suggested that as the Government did not seem inclined to take any action there was nothing more for the Board to do. This view was indorsed by the other members, and the next business was called on.

FARM LABORERS' BLOCKS.

Referring to the proposal that the Government, when opening up new lands, should set apart small areas for homesteads for farm laborers, the Secretary intimated that the recommendation on the subject had been brought under the notice of the Minister of Agriculture, who had replied that the scheme outlined was not practicable, and as only 33 out of 132 Branches of the Bureau had voted in favor of it, he could not advise the Government to adopt it.

FEW REPLIES FROM BRANCHES.

Mr. Birks desired to learn why more of the Branches did not reply to the definite questions sent from time to time by the Secretary of the Board,

It seemed remarkably strange, for example, that out of 132 Branches, only 45 had properly acknowledged a question to which an answer had been sought by Mr. Nicholls. Surely some means could be adopted which would cause the Branches to respond. Mr. Laffer suggested that the subject should be brought forward at the Congress in September. Mr. Nicholls said he intended to address the Congress on the organization and work of the Branches, and would refer to the point raised. He believed if he had persevered he could have obtained replies from all Branches in the case indicated by Mr. Birks; at the same time it had to be borne in mind that some of them were not interested in the subject, and, therefore, no doubt, had not felt called upon to express the wished-for opinion. There had been a distinct advance in the efficiency of the Branches lately, and he trusted to witness still greater improvement in the near future.

WOOL FOR AMERICA.

Mr. Jeffrey directed attention to the fact that this year there probably would be a marked shortage in the supplies of sound wools in the Commonwealth—particularly in those parts whence the bulk invariably was drawn—suitable for American competition. He therefore urged the growers in the localities in South Australia where the wools were of the right sort, to exercise special care in the preparation of their clips, as signs were not wanting that the American buyers would be here, and would be ready to pay good prices for good wools well got up.

EGYPTIAN CLOVER.

Professor Perkins asked that the Secretary should ascertain what results had been recorded by those who had received samples of Egyptian clover (Berseem) seed from the Government. The season had been altogether against the fodder, and he was the more curious, therefore, to know what success had attended the efforts of those who had grown it. The yields at Roseworthy College were not proving so heavy as in 1911. The first cut had averaged between 5 tons and 6 tons to the acre; but the second, which was practically ready, would, he believed, be better. Without the clover he did not know how they would have managed to keep the dairy going.

WHEAT EXHIBITS AND PRUNING AND SPRAYING.

Mr. Coleman brought under the notice of members the fact that the Royal Agricultural Society was considering the question of increasing the wheat exhibits at the March Show, and was striving to arouse interest among the Branches of the Agricultural Bureau, with a view to secure new exhibitors and induce the older exhibitors to show in more classes. Mr. Laffer said the Horticultural Committee of the Society was making arrangements for a vine-pruning competition and tree-spraying demonstration shortly, which should be of great interest to vinegrowers and orchardists.

ARTESIAN WATERS.

The Chairman mentioned that recently he had been reading Professor Gregory's interesting book on "The Dead Heart of Australia," in which the opinion was advanced that the artesian water supplies were not inexhaustible, and that consequently much valuable water was being allowed to run to waste. Personally, he (the Chairman) would like the Government to have inquiries made on the subject, and the correctness or otherwise of Professor Gregory's view definitely determined.

ARSENATE OF LEAD.

A request was received from the Lyndoch Branch that the Board should endeavor to secure a certain line of cheap arsenate of lead, for which it was said the Victorian Government had received an offer from England. It was decided to inform the Branch that the South Australian Fruitgrowers' Association had the matter of arsenate of lead supply under consideration.

NEW BRANCHES.

The formation of Branches was approved as follows :—

Fredrichsvalde.—Members—Messrs. A. G. Reichelt, F. W. Duldig, P. Goodfellow, T. Pfitzner, F. Pfitzner, E. A. Reichelt, F. Heintze, J. Heintze, F. W. Schutz, E. Duldig, W. Beisel, J. B. Coombe.

Berri.—Members—Messrs. A. R. Hahling, R. R. Kookay, A. Simon, T. Simon, R. W. McCreanor, B. A. Arndt, F. R. Arndt, A. P. Wishart, J. McGilton, W. Powell, W. H. Wade, T. J. McCreanor, S. E. Edwards, A. Jarvis, W. R. Lewis, H. Wescombe, S. Phillips, H. R. Antuar.

MEMBERSHIP.

The following gentlemen were admitted as members of the undermentioned Branches :—Hooper—J. R. Beck ; Maitland—A. Jarrett, R. Bagshaw, A. Darling, H. W. Tossell ; Coorabie—C. Fox, V. Kingsley, R. Weston ; Monarto South—J. Hartmann, E. Hartmann, J. G. H. Paech, J. Frahn, B. Hoff ; Carrieton—T. H. Fuller, J. W. Hardy ; Penola—F. R. Field, W. Hoffman, V. L. Lampe ; Butler—J. C. Humphrys ; Millicent—W. Downs ; Shannon—W. Watkins, W. Wemyss, C. Wemyss ; Paskeville—E. G. Lamming ; Coomooroo—H. Fisher, jun. ; Parrakie—R. E. Jose, R. L. Beddome ; Geranium—F. T. Threadgold ; Pine Forest—W. A. Attenborough ; Kanmantoo—W. G. Johncock ; Parilla Well—B. Jackel, P. Jackel, L. Jackel, G. Pahl, B. Pahl, J. Pahl, J. Flavel, sen. ; Belalie North—J. Hodby ; Pinnaroo—W. H. Chapple, J. Scales, W. Pickering ; Northfield—J. Dall ; Willowie—A. B. Wilkins ; Port Germein—W. Teasdale, W. J. McDougall ; Lyndoch—E. Filsell ; Monarto South—P. B. Frahn, F. A. R. Peach, G. H. Paech, G. H. Gogol, J. A. B. Schenschler ; Mitchell—A. Ashman ; Narrung—E. Neville, J. W. Neville ; Greenock—T. Listner, L. Tummel, S. Foebiger ; Wilkawatt—P. J. Rigney.

THE WHEAT MARKET.

The inactive condition of the wheat market in London during the greater part of last month was immediately reflected locally, prices for farmer's lots falling from 1d. to 2d. per bushel. At the close of the month, however, in Great Britain more disposition to trade was shown, and the market here firmed accordingly.

Dealing with the outlook for the future, *Broomhall's Corn Trade News* of June 25th states:—"Shipments last week were on a smaller scale, and for the remainder of the season will probably not prove excessive, and, as the demand for dry foreign wheat should, under ordinary circumstances, be heavy for the next two or three months, the stocks afloat and in merchants' hands ashore should tend to decrease materially and probably somewhat rapidly. The immediate future of prices will depend very much on crop and weather news. In Western and Southern Europe the outlook is fair, but certainly below last year's, even allowing for some increase in the French yield. The crops of exporting countries of Europe are shaping fairly well at present, but until the Russian spring wheat crop is assured, there can be no certainty of a good out-turn; the spring wheat crops of the U.S.A. and Canada are also more or less uncertain.

The following statement shows the actual monthly shipments from the principal exporting countries during the first three months of the new season for the years named:—

MONTHLY SHIPMENTS IN YEARS NAMED.

During First Quarter of Cereal Year.

	1910.			
U.S.A.	602,000	810,000	924,000	2,336,000
Canada	208,000	391,000	1,090,000	1,689,000
Russia	2,021,000	2,970,000	3,770,000	8,761,000
Balkans	1,482,000	2,042,000	1,833,000	5,357,000
India	672,000	384,000	472,000	1,528,000
Australia	312,000	497,000	460,000	2,269,000
Argentina	700,000	505,000	572,000	1,777,000
Sundry Countries	96,000	191,000	168,000	455,000
Total	6,093,000	7,790,000	9,289,000	23,172,000
	1911.			
U.S.A.	1,217,000	1,318,000	1,100,000	3,635,000
Canada	755,000	536,000	826,000	2,117,000
Russia	1,078,000	802,000	1,029,000	2,909,000
Balkans	698,000	1,606,000	1,297,000	3,601,000
India	461,000	347,000	327,000	1,135,000
Australia	528,000	410,000	606,000	1,542,000
Argentina	593,000	440,000	437,000	1,470,000
Sundry Countries.....	114,000	130,000	150,000	394,000
Total	5,442,000	5,589,000	5,772,000	16,803,000

The above figures may prove to be suggestive to our readers in any attempt they may feel disposed to make to arrive at an approximate idea of where the supplies are to come from during the first three months of the ensuing season. It will be noticed how important a part Russia and the Balkans usually play in providing the importing countries with their breadstuffs during the early months of the season."

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
July 6	Dull, with easier tendency; Liverpool, steady, but quiet	3/11	4/1 to 4/1½	4/1½ to 4/2
8	—	Do.	4/1	4/1½
9	Dull and offered lower; Liverpool very dull	Do.	Do.	Do.
10	Very dull; Liverpool dull and neglected	Do.	Do.	Do.
11	Dull and neglected	3/10 to 3/11	4/1½	4/1
12	Very dull, no demand	Do.	Do.	4/1½
13	Dull, Feb.-March, 5/0½d.; Liverpool very dull.	Do.	Do.	Do.
15	Lifeless	Do.	4/1 to 4/1½	Do.
16	No demand..	Do.	4/1½	Do.
17	Dull and neglected	Do.	Do.	4/1
18	Very weak, 3d. to 6d. lower; Liverpool quiet	Do.	Do.	Do.
19	Quiet; Liverpool steady, no quotation	Do.	Do.	Do.
20	—	Do.	Do.	Do.
22	Dull; Australian off coast, 4/10½	Do.	Do.	Do.
23	Steady, but quiet	Do.	Do.	4/1 to 4/1½
24	Steady, but quiet	Do.	Do.	Do.
25	Quiet; but quiet; Liverpool quiet	Do.	Do.	Do.
26	Quiet; Australian arrived, 4/11	Do.	4/1 to 4/1½	Do.
27	Steadily held, not active; Liverpool easier tendency	Do.	Do.	Do.
29	—	Do.	Do.	Do.
30	Steady, but quiet	Do.	Do.	Do.
31	Firm, but quiet	Do.	Do.	Do.
Aug. 1	Firm, and held higher; Liverpool firmly held, but inactive	3/11	4/1½	4/1½ to 4/2
2	Firm, but quiet	Do.	4/2	Do.
3	Firm, 3d. to 6d. advance asked; Feb.-March, 4/8½ net; Liverpool firm; Australian off coast, 5/.	Do.	Do.	Do.

STEAMER FREIGHTS.—(August 2nd)—Steamers from South Australia to United Kingdom-Continent, full cargo rates 28s. 9d. per ton (9½d. per bush.). Parcels, Port Adelaide to London-Liverpool or Continent, 21s. 6d. per ton (6½d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent, 27s. 6d. per ton (8½d. per bush.) nominal; to South Africa, 23s. 9d. per ton (7½d. per bush.).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on August 3rd—

BUTTER.

The returns of cream towards the end of last month were very satisfactory, both as regards quality and quantity. The prices at the present are :—Superfine, 1s. 6½d. ; pure creamery, 1s. 5½d. With the present prospects, however, there is no doubt a reduction in price will shortly occur.

A. W. Sandford & Co., Limited, report on August 1st—

BUTTER.—The favorable rains experienced in the early part of July had a very beneficial effect on all the agricultural areas. The result has been that increased quantities of cream and butter have come along, but as the demand has been very active, satisfactory rates have been secured. Best factory and creamery butter, fresh in prints, sold at from 1s. 5d. to 1s. 6½d. per lb. ; choice separators and dairies, 1s. 3d. to 1s. 4d. ; store and collectors, 1s. 0½d. to 1s. 1½d.

Eggs.—Values throughout the month ruled very high, constituting a record. Sales have been made as high as 1s. 5½d., but at the close of the month prices came back to 1s. 3d.

CHEESE.—Very substantial business has been experienced, with rates showing a slight easing. Quotations—New make, 9d. to 9½d. per lb. ; matured, up to 10½d.

BACON AND HAMS.—July is usually a slow month for this line, but owing to the high prices ruling for the live hog, values at the end of the month showed a firming. Best factory cured sides brought 8d. to 8½d. per lb. ; hams, 7½d. to 8½d.

HONEY.—Quality lots are very scarce, it now being late in the season. Prime clear extracted, 3½d. to 3½d. per lb. ; second grades, 2d. to 2½d. ; beeswax very saleable at 1s. 2d.

ALMONDS.—Values for shell almonds have come back somewhat during the month owing to lower figures ruling in the other States, but kernels continue in brisk demand. Brandis, 5½d. ; mixed soft shells, 5d. ; kernels wanted at 1s. 2½d.

LIVE POULTRY.—The penning throughout July has been very extensive, but as demand for both local and export trade was active, rates have been very satisfactory. Good table roosters realised 3s. to 3s. 6d. each ; plump cockerels, 2s. 3d. to 2s. 9d. ; hens and light cockerels, 1s. 10d. to 2s. 2d. ; ducks (scarce), 2s. 6d. to 3s. 6d. ; geese, 4s. to 5s. ; pigeons, 7d. ; turkeys, 7½d. to 10d. per lb. live weight for medium to good table sorts.

CARCASS MEAT.—Demand has been very good, and all quality lots met with keen competition, nice rates ruling. Bright handy size shop porkers brought 6½d. to 7d. per lb. ; good baconers, 5d. to 6d. ; heavy and poor stuff, 2d. to 3d. Nice dairy veal, 3½d. to 4½d. ; medium to fair quality, 2d. to 2½d.

POTATOES AND ONIONS.—Values in potatoes firmed considerably during the month in sympathy with the shortage elsewhere, while in onions prices have also improved somewhat. Quotations—Potatoes, £7 5s. to £7 15s. per ton on trucks, Gambier ; onions, £14 to £15 per ton on trucks, Gambier.

RAINFALL TABLE.

The following table shows the rainfall for July, 1912, at the undermentioned stations, also the average total rainfall for the first seven months in the year, and the total for the seven months of 1912 and 1911 respectively :—

Station.	For July, 1912.	Av'ge. to End July.	To End July, 1912.	To End July, 1911.	Station.	For July, 1912.	Av'ge. to End July.	To End July, 1912.	To End July, 1911.
Adelaide	2.60	12.67	10.20	9.04	Hamley Bridge	1.93	9.67	5.36	8.58
Hawker	1.52	6.85	6.26	5.00	Kapunda ...	2.62	11.56	6.53	9.77
Cradock	1.06	6.28	3.55	4.28	Freeling ...	2.38	10.34	6.32	9.16
Wilson	1.37	6.86	6.14	3.67	Stockwell ...	3.07	11.70	7.91	11.21
Gordon	1.23	8.72	4.33	3.99	Nuriootpa ..	3.10	12.28	7.56	8.95
Qorn	1.82	7.69	8.97	4.86	Angaston ...	3.67	12.44	10.06	13.88
Port Augusta	1.27	5.50	5.31	4.80	Tanunda	4.55	12.84	11.81	15.13
Port Germein	1.62	7.30	4.98	5.79	Lyndoch ...	2.95	13.43	9.04	11.44
Port Pirie ..	1.41	7.61	4.90	8.48	Mallala	2.01	9.97	6.13	9.08
Crystal Brook	1.79	8.68	6.73	8.93	Roseworthy .	2.01	10.22	5.93	7.97
Pt. Broughton	1.93	8.48	7.40	8.51	Gawler	2.70	11.42	6.95	8.83
Bute	2.68	9.16	6.64	10.89	Smithfield ..	1.90	9.93	6.54	9.35
Hammond ..	1.44	6.18	4.58	7.51	Two Wells ...	1.74	10.31	5.46	7.01
Bruce	1.90	5.17	5.97	3.62	Virginia	1.94	10.58	5.97	8.21
Wilmington .	2.95	10.20	11.05	9.77	Salisbury ...	2.30	11.13	7.66	11.00
Melrose	3.49	13.62	11.46	10.53	Teatree Gully	2.89	17.00	11.91	12.65
Booloroo Cntr	1.71	8.92	5.79	6.17	Magill	2.83	15.69	11.20	12.73
Wirrabara...	3.05	10.87	9.09	7.85	Mitcham ...	2.39	14.66	9.41	11.66
Appila	1.64	8.35	9.89	7.47	Craferas	6.86	27.69	19.88	27.55
Laura	2.11	9.96	6.40	9.14	Clarendon ..	3.84	20.47	12.98	18.32
Caltowie	1.88	9.47	5.82	9.63	Morphett Vale	2.91	14.26	8.97	11.85
Jamestown ..	2.61	9.47	8.91	11.08	Noarlunga ..	3.05	12.40	8.65	12.23
Gladstone ..	1.71	8.76	5.56	9.48	Willunga ...	3.16	15.79	10.62	17.11
Georgetown .	2.14	10.50	7.40	9.94	Aldinga	2.88	12.53	8.18	10.88
Narridy	2.16	9.64	7.19	10.23	Normanville	2.58	12.84	7.66	12.11
Redhill	2.70	9.56	8.25	8.58	Yankalilla...	3.06	14.15	9.63	14.13
Koolunga ...	2.62	9.00	7.31	8.50	Eudunda....	1.82	9.58	7.56	10.40
Carrieton ...	1.81	6.63	5.10	5.35	Sutherlands .	1.09	5.44	5.33	6.56
Eurolia	1.45	7.18	6.21	5.81	Truro.....	3.30	11.06	9.64	10.75
Johnsburg ..	1.33	5.26	5.66	4.71	Palmer	2.17	—	6.68	6.93
Orroroo	1.88	7.84	5.43	5.14	Mt. Pleasant.	3.60	16.07	9.04	13.83
Black Rock ..	1.78	6.83	5.42	6.06	Blumberg ..	4.27	17.83	10.53	14.37
Petersburg ..	1.43	7.12	6.49	7.07	Gumeracha ...	5.06	19.57	12.90	17.46
Yongala	1.65	7.44	5.46	7.80	Lobethal ...	5.08	21.27	12.47	19.25
Terowie	1.34	7.28	5.75	7.09	Woodside ...	5.68	18.44	12.65	19.04
Yarcowie ...	1.54	7.62	6.44	8.16	Hahndorf ...	6.56	20.68	13.34	22.32
Hallett	1.84	9.10	6.39	9.37	Nairne	4.06	16.95	10.07	19.54
Mount Bryan	2.87	8.91	7.32	8.04	Mount Barker	5.21	18.21	11.81	18.74
Burra	3.05	10.23	8.82	10.11	Echunga ...	4.63	19.39	13.02	21.78
Snowtown...	2.50	9.13	7.69	6.99	Macclesfield .	4.35	17.59	11.15	19.45
Brinkworth .	3.32	8.52	8.13	8.44	Meadows ...	4.57	20.86	13.97	22.77
Blyth.....	2.24	9.48	6.77	9.11	Strathalbyn .	2.64	11.27	8.14	12.62
Clare	3.19	4.22	10.08	13.27	Callington ..	1.68	9.32	4.90	8.50
Mintaro Cntrl.	3.25	12.49	7.78	12.53	Langhorne's B.	1.27	8.95	5.10	7.94
Wetvale	2.95	15.83	9.88	15.02	Milang	1.10	10.31	5.01	6.06
Auburn	2.32	14.07	7.39	13.97	Walleroo ...	3.86	8.65	9.65	10.00
Manoora ...	1.57	10.07	5.89	9.11	Kadina	3.20	9.94	8.73	9.65
Hoyleton ...	2.18	10.74	5.28	10.42	Moonta	2.80	9.62	8.08	8.49
Balaklava ..	1.69	9.43	4.89	9.57	Green's Plains	2.83	9.52	6.55	6.87
Pt. Wakefield	1.37	8.15	5.34	11.59	Maitland ...	2.60	12.41	7.63	12.72
Saddleworth	1.98	11.70	6.04	9.68	Ardrossan ..	1.69	8.43	6.20	8.46
Marrabel ...	2.14	10.91	5.30	8.36	Pt. Victoria .	2.43	9.50	7.23	10.47
Riverton ...	2.16	11.86	6.35	11.47	Curramulka .	2.40	11.42	6.28	9.99
Tarlee	2.00	10.04	6.26	8.56	Minlaton ...	2.84	10.70	6.26	9.48
Stockport ..	1.75	9.39	5.26	7.39	Stansbury ..	2.24	10.28	7.34	10.88

RAINFALL TABLE—*continued.*

Station.	For July, 1912.	Av'ge. to End July.	To End Julr, 1912.	To End July, 1911.	Station.	For July, 1912.	Av'ge. to End July.	To End July, 1912.	To End July, 1911.
Warooka ...	3.47	10.93	7.54	12.70	Bordertown .	1.67	11.26	5.86	9.77
Yorke town .	2.81	10.70	7.50	10.09	Wolseley ...	1.66	9.89	5.53	9.99
Edithburgh .	2.48	10.15	6.80	8.73	Frances	2.39	11.14	8.27	13.41
Fowler's Bay	1.63	8.30	7.12	7.78	Naracoorte .	2.45	12.80	9.05	13.59
Streaky Bay	3.19	9.98	9.06	10.16	Lucindale ..	2.30	13.47	9.28	16.23
Pt. Elliston .	3.73	10.56	9.45	12.12	Penola	2.55	15.25	12.05	17.49
Pt. Lincoln..	3.59	12.44	12.65	12.04	Millicent ...	4.06	17.74	13.67	22.07
Cowell .....	.98	7.00	6.76	7.05	Mt. Gambier.	2.57	18.34	13.90	21.45
Queenscliffe .	4.75	11.61	10.10	—	Wellington .	1.59	8.80	5.51	7.90
Port Elliot .	2.75	12.53	8.44	10.28	Murray Brdg.	1.04	8.27	4.48	6.68
Goolwa	2.48	10.76	8.87	11.38	Mannum ...	1.27	7.00	4.37	3.83
Meninnie ...	2.04	11.39	6.94	9.51	Morgan ....	.89	4.92	4.70	5.28
Kingston....	4.15	15.18	15.18	14.60	Overland Crnr.	.71	6.30	5.13	7.60
Robe	2.83	5.39	9.92	16.69	Renmark ...	.36	5.71	4.57	7.18
Beachport...	3.98	17.21	11.63	20.79	Lameroo ...	2.17	—	8.72	—
Coonalpyn ..	2.34	10.24	7.63	9.36					

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of over 6,000 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

AGRICULTURAL BUREAU REPORTS.

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* No report received during the month of July.

† Only formal business transacted at the last meeting.



ANNUAL MEETINGS OF BRANCHES.

The majority of the Branches will now be holding their annual meetings and electing their officers. In such cases, unless some paper is read or discussion entered upon, the reports will necessarily be classed as formal.—[Ed.]

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Amyton, June 25.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O'Donoghue (chair), H. R. Gum, T. Ward, M. and D. Corcoran, A. Crisp (Hon. Sec.), and two visitors.

IMPROVEMENT OF BUREAU MEETINGS.—The Chairman, in a paper on this subject, said every member should be regular in his attendance at meetings, and should recognise his responsibility to contribute something towards the programme. There was a prevalent idea that because a person's education had been to some extent neglected, an attempt by him to write a paper might lead to ridicule. This was a mistake, as what was wanted in the papers was sound knowledge based on practical experience. When a subject was brought forward for discussion, members could each give their opinion on it. Home-stead meetings were to be encouraged, as members would be in a position to see the methods adopted by others in working their holdings. Members generally expressed themselves as being in accord with the views of the writer of the paper.

Davenport, July 18.

(Average annual rainfall, 9 in.)

PRESENT.—Messrs. Roberts (chair), Messenger, Holdsworth, Bier, and Lecky (Hon. Sec.).

EVAPORATION OF SOIL MOISTURE.—The following paper on this subject was contributed by Mr. E. H. R. Messenger :—"There is no doubting the fact that evaporation is one of the most important natural forces, and the question demands the fullest attention and consideration. The controlling or arresting of a portion of this evaporation is absolutely necessary to successful gardening. The surface of the earth is largely composed of what are called capillary tubes, which are continually gasping for moisture in a dry climate. After each rain or watering these tubes have been supplied, and it is then the gardener's duty to do all he can to arrest evaporation. As soon as the surface becomes dry enough he should get to work with the plough, fork, or hoe and thoroughly break and work the ground, thereby producing a tilth or mulch which will prevent the moisture returning too rapidly to the surface and disappearing in vapor. If mulching is continued after each rain or watering much moisture which would be beneficial to all plant life would be conserved. Should the tubes not be broken and destroyed as I have indicated, the moisture previously stored in the subsoil will soon evaporate and the earth will become dry and parched very quickly; but if, on the other hand, the surface is kept loose, we shall find the plants do much better with less water. Good cultivation is one of the most important points connected with successful gardening. Not only does the want of tilth prevent the plants from growing and sending out their root fibres in search of food, but the want of aeration prevents the growth of microbes whose business it is to cause the manure to

decompose and assume forms and combinations suitable to all plant life. In addition to the cultivation it is necessary that the soil be charged with humus. In a dry district like the north this is of the utmost importance. Humus consists of decayed vegetable matter, which should be first spread over the land and then turned in. Land without humus is dead, and although it may be rich in all the other elements of plant food, without humus the crop will be of little value. In experiments conducted at Minnesota it was found that continuous cropping for eight years caused an annual loss of over 2,000lbs. of humus per acre, due to the fermentation and decomposition of organic matter in the soil, causing it to be less retentive of moisture, lighter in color, and heavier per cubic foot. It is absolutely necessary that humus should be provided to form a home for the bacteria upon which it is now known depends largely the conversion of the soil elements into available plant food. It is also necessary to keep the soil open, so that the sun and light may penetrate it, thus giving life and vigor to the plant. Humus, then, being so valuable in restoring and maintaining the fertility of the land, it is of the utmost importance that the gardener should know how to secure it. Some grow a green cover and turn it under, which, no doubt, is a good thing for a large piece of land, but for a small garden (fruit or vegetable) I would recommend a dressing of stable manure, because this is much quicker than waiting for the green cover to grow. I find it a good plan to cover the surface with stable manure, give it a good watering, and turn it over a few times before planting anything. Before transplanting cabbages and cauliflowers I make a trench about 4in. or 5in. deep, with a liberal amount of manure well worked into the soil, and put the plants well down, say 18in. apart, and keep them well watered and cultivated. In fact, my method is to water and cultivate alternately for a few weeks, and as the plants grow, fill in the trench, which is of great advantage and assistance to the growth."

Hawker, July 2

(Average annual rainfall, 11½in.)

PRESENT.—Messrs. G. H. Wright (chair), J. Palin, B. Mansom, J. Schnell, G. Moller, J. Smith (Hon. Sec.).

STONE-GATHERING.—A short paper on this subject was contributed by Mr. J. Palin, in which he stated that the farmers should get stones off their land before the crop attained any height. It was a very tiresome occupation to do this by hand, and every encouragement should be given to implement manufacturers to devise a machine that would either lift the stones into drays or put them into rows.

Mount Remarkable, June 26.

(Average annual rainfall, 21in.)

PRESENT.—Messrs. L. A. Bauer (chair), W. Foot, M. G. Giles, N. S. Giles, J. McIntosh, H. H. Davie (Hon. Sec.).

INFERTILE EGGS.—Mr. N. S. Giles, who had been conducting experiments with the idea of ascertaining the length of time that eggs could be kept, produced some infertile eggs that had been in store for six months. These had not been treated in any way, but were found to be in first class condition when broken.

Quorn, June 29.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. R. Thompson (chair), Cook, Schulz, Noll, Brewster, Britza, Patten (Hon. Sec.).

EXHIBITS.—Mr. Cook tabled some fine cabbages and lettuce, which were grown by him at Quorn, and much admired by members. Mr. Britza produced some very nice turnips, cabbages, lettuce, and three fine stools of Baker's Early, Newmans, and Federation wheats. Mr. Britza was of the opinion that the two former varieties were better than Federation for the Northern districts.

GARDENING.—In a short paper on this subject Mr. Britza said that the cultivation of a garden in the North was somewhat difficult, on account of the limited rainfall. He had a small garden irrigated through a pipe down the centre, to which T pieces were fixed at intervals of 35ft. The watering was done with sprinklers. He found that stable manure

was most suitable for gardening, and he made a practice of ploughing to a depth of 10in., after which the soil was worked thoroughly. For planting turnips he would mix 1oz. of seed with a gallon of sand and broadcast this.

MARES IN SEASON.—Mr. Schulz contributed the following paper:—"The mare may be served just as she is coming into season, but better just after her greatest passion of heat has passed. The best time for service is early in the morning. After she has been served let her remain quiet, or, if she seems fretful, walk her slowly about and, after 15 minutes, turn her into a pasture that she may amuse herself eating grass, but not in a pasture where there are other stock. A mare will usually receive the horse on the eighth or ninth day after foaling, even though she exhibits no particular sign of heat; if not, she may come into heat when the foal is about four weeks old. After being served, try her with the horse on the ninth day; if she refuses, try her again on the seventh day following. Upon a second refusal, try her again on the fifth day after that. If she then refuses, she may be fairly considered to be with foal. Above all things the mare should be kept away from teasing horses, from badly castrated geldings, or horses imperfectly gelded and bearing one testicle in the body; from yearling colts, and from other mares in heat. When once the time of heat is known, and service given, the mare should be returned to the horse as recommended, so that the time when the mare should receive the horse may not run over. Forty-four weeks being the usual time the mare goes with foal, if the service of the stallion is delayed it will bring the birth of the next foal too late, perhaps, in the next year, and possibly one year may have to be omitted in breeding."

Willowie, June 25.

PRESENT.—Messrs. T. Hawke (chair), E. S. Bristow, L. Hughes, E. J. Kentish, S. C. Greig, F. Richter, A. R. Wilkin, B. Bull, L. McCallum, W. P. Foulis (Hon. Sec.) and three visitors.

FEEDING FARM STOCK.—In opening a discussion on this subject, Mr. Hawke said he preferred feeding horses on long hay rather than on hay chaff. The hay should be of medium growth, not too green, and should contain a fair percentage of corn. He would not keep a horse after it had reached the age of 10 or 12 years. Mr. Bristow thought good long hay was suitable for feeding horses, but hay grown on flooded land or in water courses, as was the case with most of the hay produced in this district, was too coarse and required to be chaffed. Mr. L. McCallum thought horses should be fed on chaff in cold weather. In damp weather the hay was too tough and hard for the horses to chew, and there was a considerable amount of waste on account of it being pulled out of the mangers. There was a tendency for the horses to eat only the heads when the sheaves were long. When they were doing hard work they required grain with their feed, and this could only be given when the hay was chaffed. When chaff was dear, farmers could feed horses that were not working on equal parts of wheat and hay chaff. He would give each horse a sheaf of long hay at night, and he always made a practise of damping the chaff when mixing crushed grain with it. For feeding cows he would give pollard or bran mixed with the chaff, and molasses was also good. Good results could not be secured by feeding them on long hay. It was not advisable to sell horses when they were 10 years old, as they were then at their best for heavy work. Mr. Kentish thought horses would do well on long hay in the summer, but not in the winter. Some purgative should be added when chaff was fed to horses. Bran would have the desired effect. He did not favor selling horses at 10 years of age, but would prefer to sell the younger animals. He had secured good results from cows when fed on long hay. Mr. S. Greig said whole or crushed wheat was suitable for mixing with chaff. He had fed horses heavily on this without ill effect, except that there was a tendency for it to make the shoulders soft. Mr. L. Hughes had had better results from cows fed on dry cocky chaff than from those fed on long hay. The general opinion of members was that wheat was better than oats for mixing with chaff. A good ration consisted of chaff with a small amount of grain and a liberal addition of bran.

Wilmington, June 26.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. J. Hannagan (chair), S. and D. George, A. R. and E. J. Gloede, Litchfield, McGhee, J. and G. Schuppan, Slec, Zimmermann, B. Jericho (Hon. Sec.), and two visitors.

AGRICULTURE IN THE EARLY DAYS.—Mr. Payne read the following paper :—

"It will not be an easy matter to say in a short paper all that is forced upon one's memory respecting the vast developments that have taken place in our agricultural industry during the past 50 years ; but it may be possible to touch on points which have proved such great factors in the up-building of agriculture in this State. My first recollection of wheat-growing in South Australia takes me back to 1857, when for a time I was a resident in the Angaston District. At that time the areas cultivated were small ; a paddock of from 80 to 100 acres would have been considered extensive cultivation. The land upon which the wheat was grown had been heavily timbered, and the trees—mostly gigantic gums—had been grubbed one at a time, and the timber burnt generally, but in some few cases the large timber was converted into charcoal where there was a demand for that fuel locally. Of course, the clearing of such lands was a very slow process, and also expensive in some cases, but the labor employed in most instances was that of the pioneer himself, with such help as could be obtained from wife and children. In many instances have I seen the noble helpmeet to the honest and hard-toiling husband assisting to cut up the fallen tree with the crosscut saw, and help roll the logs into a heap to be burnt. Boys and girls alike toiled hard, early and late, to aid their noble father in his praiseworthy efforts to increase his acreage for cultivation. It will be readily seen how slow the process of cultivation was in the heavily timbered districts of Angaston, Tanunda, Lyndoch Valley, Nuriootpa, Eden Valley, Mount Pleasant, Gumeracha, and many other districts ; in fact many a man has spent the prime of manhood in clearing a small holding of 80 acres—the original sections. Having cleared a small area of land, every effort was then made to break up the virgin soil, and here again the difficulties to be met with were legion. Horses were few, and most expensive to obtain, thus only being within the purchasing powers of those with capital at command, and these were comparatively few in number. The draught animals mostly used were bullocks, and these, though strong and cheaply fed and purchased, were slow in their movements, and required an extra hand to drive them ; the driver generally being a youth or strong maiden. The plough was single-furrowed, consequently the area covered in a day—though this was counted from daylight to dark, virtually—was very small, and the more so when in contrast with the machinery of to-day. Ploughing completed, the work of broadcasting the seed was begun. It was all done by hand ; and then followed the harrowing, which was done in many instances by a young woman, whilst her father was busy sowing. The land being rich and the rainfall liberal, the growth of the wheat was rapid and healthy ; and 40bush. per acre was considered a fair crop. Often have I seen paddocks which gave 50bush. and over. The crop ripened, now came another task—that of gathering the grain. No strippers or harvesters were available then. All had to be cut with the sickle, and afterwards threshed, either by the travelling steam thresher, or trampled out by bullocks or horses ; but in most cases it was done with a grooved roller. The cleaning of the grain—excepting again with the better financed man—was of a most primitive character, consequently slow, and demanding all the hands available. The grain secured, then followed the carting to market, and this involved long travelling and camping out, and was mostly done with bullock teams. The prices obtained varied from 6s. to 8s., and sometimes went up to 12s. and 13s. Still, for many years the income gained was scanty, but being in most cases wisely and economically husbanded, in course of time accumulated, and placed the head of the family in more comfortable circumstances, and provided capital for further land purchases. It was a battle in which all who could work were called upon to do their utmost, and I believe I am justified in saying that the help was given cheerfully. By-products were not lost sight of—cows and poultry were requisitioned to add to the income. In small towns the demand for butter and eggs was very limited, and so a better market had to be sought, at the expense of a weary tramp over long miles. Often have I seen a strong young woman of from 18 to 20 years travel from Angaston to Gawler and back again the same day, a distance of 22 miles, carrying a box of butter and eggs slung over her shoulder, and bringing back necessary groceries purchased by the produce sold. This was done for some years by many, until improved circumstances permitted the purchase of a horse and spring cart. It is not necessary that I should elaborate upon such episodes of the life of the agricultural pioneers of 50 years ago ; suffice it to say that the privations endured were consonant with a dogged determination to succeed, and be it said that the agricultural industries of to-day have been built upon the solid foundation laid by these early pioneers. In the early sixties lands in the northern areas were talked over, and soon bands of yeomanry were found ready and anxious to go farther afield where cheaper land could be obtained, and operations carried on under easier conditions. Then, in the seventies, followed the opening up of the northern areas, and this was the commencement of extensive cultivation, and the establishment of this great industry

upon broad lines. Rightly it has been stated that our two staple products are wheat and wool, and well does it behove us to see to it that the very best is obtained. There can be offered to-day no excuses for apathy or carelessness in agricultural efforts. There are so many channels through which all practical information can be obtained, that no earnest seeker after knowledge should be delayed in his movements through lack of information. Our agricultural bureaus, our scientific centres, colleges, and other authorities are so replete with the soundest and most practical training and teaching that ordinary and even special troubles may be easily removed. I cannot emphasize too strongly the intense value of the Bureau Branches. As a medium through which the most practical and soundest information can readily be obtained they are without comparison, and are worthy of the fullest support every member can give. Until within a year ago I had been a member of this Branch for 11 continuous years, and no happier or more profitable period of my life had been spent than in forwarding its interests. I would commend to every earnest townsman, and especially those in rural districts, the immense value of these branches as channels through which the very best information can at all times be obtained upon all matters of agricultural importance. I would say, as parting words—Be earnest; be thorough. Do your share of work, and do it well, and thus as time passes, we shall be helping to build up one of the finest institutions our land possesses."

Wirrabara, June 29.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. P. J. Curnow (chair), J., G., and E. Hollett, J. F. Pitman, C. H. Curnow, S. Thistleton, C. F. H. Borgas, W. H. and E. J. Stevens, V. and H. Lawson, R. L. Watson, F. T. Jettner, W. Bowman, A. R. Woodlands (Hon. Sec.), and one visitor.

UNDERGROUND TANKS.—In a paper on this subject Mr. J. F. Pitman said that the concrete method of building underground tanks had proved to be superior to the mason-work system. The concrete made a much more solid wall, and was not so liable to crack. However much care was taken with the masonwork, it was impossible to build a wall without a hollow in the back somewhere. When the weight of the water was brought to bear on this it would be found that the masonwork gave way, causing a crack in the wall, and allowing the tank to leak. Where the nature of the ground permitted the digging of a ring for concrete walls, he advocated the following method of procedure:—Mark out the size of the tank and then mark another ring 16in. out, this being provision for the thickness of the wall. With the pick and shovel dig out the trench to the required depth. This could then be filled with concrete, and the earth in the centre could be removed when the concrete was set. For the concrete good clean gravel, not too coarse, should be used. If this were not obtainable, clean sand with cracked up metal would suit the purpose. One part of lime to two parts of gravel should be mixed as thinly as possible. Where it was impossible to dig out a circular trench, as before described, and it was necessary to construct the walls of stone and mortar, he thought the best means would be to build a wall with a good face and fill up the back with concrete, which should be thin enough to run into the crevices in the stones. Good, clean clay rammed in behind the wall would go a considerable way towards making it watertight; but it was essential that the ramming should be well done. It was better to make all underground tanks long and narrow, as there was then less pressure on the sides; 15ft. was a fair depth. A good discussion followed the reading of the paper. Mr. V. Lawson said underground tanks should be built wider at the bottom than at the top, for when the winter rains swelled the ground the pressure on the wall of the tank would be in a downward direction, and no amount of pressure in this way would cause the walls to crack.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Burra, June 28.

PRESENT.—Messrs. F. G. Scholtz, A. E. McWaters, H. H. Thomas, J. H. Rogers, F. Duldig, H. Bagg, H. Finch, F. J. Carey (Hon. Sec.), and one visitor.

FOLLOWING.—In a paper on this subject, Mr. F. G. Scholtz said following should be started as early as possible in June, and wherever it was practicable should be completed

by August. The plough used should not cut a furrow larger than 7½ in., and the shares should be set level. A five-furrow plough, cutting a 7½ in. furrow, would be found to draw lighter than a four-furrow implement cutting a 9 in. furrow. Where the average rainfall was 14 in. or over, he would plough to a depth of at least 5 in., but 3 in. was quite sufficient where the annual fall was under 12 in. New land absorbed moisture more readily than land that had been worked for a number of years. In spite of the contention that it was inadvisable to plough deeply where a clay subsoil was near the surface, he had turned up from 1½ in. to 2 in. of clay in red sandy loam, and the crop on this was the best he secured. However, he would not advise anyone to turn up the clay in a hard, red, poor soil, as there would be a tendency for it to cake on top. He made a practice of harrowing the fallow immediately after ploughing. If the ground were fairly loose, it was only necessary to go over it once, but if it had been ploughed up wet, and set hard, it was advisable to put the harrows over it twice and then cultivate it in September, and again about the middle of October. He estimated that land cultivated in this way would return one-quarter of a ton more to the acre than land only cultivated once. The cultivator should not cut more than 6 in. between the tines. It would then destroy the weeds more effectively, draw lighter, and go into the ground better than an implement with too much dip. One team of eight good horses would be found sufficient to plough, harrow, and cultivate twice an area of 200 acres. It was a good idea, in the event of a precipitation of ½ in. or over between October and February, to put the harrows over the fallow again.

Crystal Brook, June 29.

(Average annual rainfall, 15 in.)

PRESENT.—Messesrs. H. Billinghamurst, B.A. (chair), R. Shaw, B. Flavel, E. Robinson, G. Miell, R. Heaslip, W. J. Venning, G. Sargent, Jno. Pridham, I. Teakle, W. W. Lovelock, M. P. Pavy, W. S. Carmichael, G. Davidson, Jas. Forgan, W. C. Wood, B. Weston, A. E. Cooke, W. W. Robinson, and M. Weston (Hon. Sec.), and three visitors.

HARVESTING AND MARKETING WHEAT.—Mr. R. Heaslip read a paper on this subject, in which he stated that farmers would save a considerable amount if they co-operated and purchased their cornsacks direct. Continuing, the paper said—"With reference to the gathering of the crop, I must ask my hearers to remember that I am dealing with the durability of the machinery used and the cost of repairs over a number of years. I will divide the crops to be dealt with into two classes, viz., those growing on smooth or plain land, and those on hilly, rough, stony, or mullenized land. With the smooth, level country the harvester, with the present state of the labor market, is the more economical machine. In the first place the wear and tear is not nearly as great as on rougher land. The driver can better regulate the pace, and therefore produce a more uniform sample with less waste than can be done upon hilly, stony, or stumpy land. In going up or down hills it is a difficult matter to drive the winnower at a regular speed. When ascending the rate of revolution of the fans is reduced and more of the heavier particles pass through the sieves into the corn box. In descending, unless great care is taken, a certain amount of the corn will be blown over the sieves and out with the chaff. With regard to the stripper and motor winnower I am quite conversant with the labor difficulty at harvest time, but I still think that on rough and hilly ground it is the more economical machine. It has this advantage over the harvester--the wheaten chaff, which has a fair value, especially in the drier seasons when hay is scarce, and in new mallee or stony country, where it is troublesome to work the binder, is saved. Having arrived at the best means of harvesting, the next point is the disposal of the wheat. Any farmer, say, within three or four miles of a railway station can with profit keep his wheat in his barn rather than store it with the merchants. By retaining his wheat he has a choice of buyers instead of being practically bound to take the price offered by the firm with whom it is stored, and this sometimes means several pence per bushel. I consider the practice of leaving the storage notes in the hands of agents, instructing them to sell at the first drop, is detrimental to the interests of the wheatgrower. The merchants drop the wheat 1d. or more to call in wheat so held, when in reality the market value of wheat is on the eve of a better price." In discussing the subject, Mr. Venning expressed the view that more wheaten chaff should be saved. There was as much waste of grain with the stripper as with the harvester. Mr. C. E. Birks (Advisory Board) gave his experience in harvesting crops with the aid of the binder and thresher, the use of which had been discontinued in his district owing to the high cost of labor. They had, however, reaped an advantage this season through having the straw (eight years old) available for stock. On this the young stock particularly did remarkably well; in fact, as well as on three or four year old

hay. He did not think there was much waste with harvesters if they were properly worked. Mr. Cooke referred to the fact that although farmers generally were in favor of the harvester Professor Lowrie was not an advocate of its use. Members generally agreed with the views expressed in the paper.

Georgetown, July 15.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. J. Freebairn (chair), M. Hill, G. Hill, M. J. McAuley, A. Erickson, J. Wyatt, A. Thomson, S. Eyre (Hon. Sec.), and two visitors.

FALLOW.—In a paper on this subject Mr. M. Bond said that where land was clean he did not think it would make any difference whether it was ploughed deep or shallow, but the chief difficulty in this district was to get the land clean. To plough dirty land deeply was a mistake, as the weeds would not grow until the following winter, and at sowing time it would be necessary, in order to kill the weeds, to plough too deeply to provide a good seedbed. He advised burning the stubble and the hay stumps, and if this could be done early, a good proportion of the mustard and sheepweed seeds would be destroyed. It could then be cultivated before sowing time as deep as could be done without rooting up too many stumps; but it was better to only scratch it over than to make it lumpy. After sowing it should be gone over again whilst the rubbish was young. Where the ground was so wet that it required a greater strength than was available to pull through, every other tine of the cultivator could be hooked up. This would bury the weeds that were not cut. The idea which prompted the working was to secure a growth of weeds after every cultivation. Land that had been left out for a few years would be found very difficult to deal with, especially if it had been covered with mustard yearly. The most suitable means would be to burn after harvest, and then treat it in a manner similar to that advocated for stubble land. Or if it were thought that the dry grass could be covered, a light ploughing might be given with advantage. The share preferred by the writer was one 8in. long and 7in. wide for a cultivator that cut 6in. a tine.

Georgetown, July 27.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. W. J. Freebairn (chair), M. A. Hill, M. J. McCulley, R. J. McDonald, A. Thompson, E. Hewitt, S. Eyre (Hon. Sec.), and one visitor.

CO-OPERATIVE SHEARING.—The paper on this subject read by Mr. J. J. Cormack, of the Amyton Branch, and printed on page 1276 of the July issue, was read and discussed. For the past three years a system of co-operative shearing had been carried out in this district, and a number of members of the Branch were shareholders. Members agreed that the idea was a good one and it had worked well in the case under notice.

Gladstone, July 1.

PRESENT.—Messrs. R. E. Lines (chair), W. Brayley, J. H. Sargent, T. Hollitt, T. J. Brown, A. J. Anderson, T. A. Sandow, A. B. Blessing, W. Growden, P. Sampson, W. T. Sargent, F. Aughey, J. S. and G. A. Fisher, P. Masters, R. G. Peters, G. M. Black, E. H. Davies, H. Fay, W. Odgers (Acting Hon. Sec.), and four visitors.

SHEEP.—Mr. W. H. Brayley read the following paper :—"It is now generally recognised amongst farmers that no farm is complete without a flock of sheep, if it is only to keep the homestead in mutton. It is much cheaper to grow one's own mutton than to purchase it. Sheep well managed can be made a very profitable source of income, either in the way of wool and mutton or the raising of lambs for the export trade. In the first place care must be taken not to over-stock. It is better to err the other way. Of course, in a season like the present the most careful farmer is perhaps very short of feed, but every farmer should have some surplus hay on hand to help the stock when the season is late.

In every case the breed of sheep a farmer keeps must be determined by the question whether wool or mutton or the raising of lambs for the market is the object. In the north of this State the Merino is the best all round breed to start with. The best fat lambs are usually bred from ewes strong in Merino blood, but I am not sure that better results in this line of lamb-raising for the market cannot be obtained by breeding from ewes of the first cross only. They are quieter and make better mothers, besides being more prolific than the Merinos. When breeding for wool production the best Merinos that the farmer can procure should be used. By the judicious introduction of new blood every year or two, constant culling, and using good rams, he should secure good returns. Sheep, like all other stock, require plenty of feed and water, more especially the latter, when feeding on dry stubbles during the hot summer months. Under such conditions they do best when they can go to the water whenever they feel disposed. The more sheep are left to themselves and the less they are disturbed the better. Sheep that have to be driven any distance to water generally carry a very much dirtier fleece. When kept on a farm under cultivation for cereals, and made to do the work on the fallows that should be done by the cultivator, they will not produce their wool in such good condition as they are capable of doing under more favorable circumstances. Clearing the fallows and fattening lambs do not work together in the average season. Care should be taken to provide suitable feed if lambs are to be successfully marketed. When lucerne can be grown lamb-raising can be made a profitable business. When wool production is the objective, just before shearing go through the flock and cull out all the old and inferior ewes. You should have younger ewes to take their place. The culls, if not wanted for mutton on the farm, should be sold as soon as shorn, as they are generally then in good condition. If they have reared lambs, wean the lambs from them as early as possible after the ewes are shorn and before the feed becomes too dry, and they will soon be fit for the market. The shearing should be done before the seeds are likely to get into the wool. The marketing of clips from an average sized farm on the lines adopted on large stations does not pay. An average farmer would scarcely have more than one or two bales of a sort, and therefore where one has a clip of 10 bales or under the best plan is to take off the bellies, portions of the breech, and all the stained parts around the edges. By heavily skirting clips from small flocks too many parts of bales are put up, and the bags go into the "star lots." With flocks of 2,000 or over the deeper skirting may be carried out, as there is so much more material to work on. All broken fleeces should be kept out, and if there is not enough to make a bale these may be put into bags. This is not generally worth so much as good belly wool. All that is required with the clip from the small flock is to brand the bales with the sex and the class of wool, such as fleece, lambs, bellies, pieces, or locks. I believe in classing the wool to the utmost limit that can be afforded, according to the size of the flock. From past experience I am satisfied that there is a good profit to be made from keeping sheep on the farm." An interesting discussion followed the reading of the paper. In reply to a question, the writer stated that Merinos were inferior to the Shropshires for early lambs, but the best freezers were secured when these were crossed. It was advisable to introduce fresh blood into the flock at periods of three years. Sheep should not be put on fallow just prior to being shorn, as the wool became dirty. Dipping was not necessary in this district, although he had tried it and the result was an improvement.

MERINO WOOLS.—A handsome gift, in the shape of a glass case of Merino wools, was presented to the Bureau by Mr. Brayley.

Port Pirie, June 1.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. E. B. Welch (chair), H. G. Hawkins, T. Johns, D. McEwin, A. M. Lawrie, F. A. Johns, H. F. Richter, J. Greig, T. B. Jose, and W. R. Wright (Hon. Sec.)

CO-OPERATIVE MARKETING.—Mr. H. G. Hawkins read a paper on this subject, in which he stated that the aim of the farmer should be to secure the greatest return possible from his land by adopting the most economical and up-to-date method of production, and then to dispose of his produce to the best advantage. This could be done by co-operative marketing. There were too many middlemen engaged in this business, and as these had to be paid the farmer suffered. The heavy commission, &c., which were paid on farm implements and machinery could be done away with also in this way. In discussing the subject, Mr. Grieg said co-operation was the solution of the marketing problem, with which opinion members generally concurred.

Port Pirie, July 6.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. J. Greig (chair), T. B. Jose, C. E. Birks, H. F. Richter, F. A. Johns, A. M. Lawrie, H. Brine, W. R. Wright (Hon. Sec.).

SOIL CULTIVATION.—The following paper was read by Mr. C. E. Birks:—"This, to the agriculturist, is the most important function on the farm, for success depends to a great extent on the thoroughness with which it is carried out. Not even in one district, much less one State, can any hard and fast rules be laid down to guide the operator. When the general principles underlying good cultivation are mastered the successful application of them to any particular soil is where care and experience are required. Two soils may be of somewhat similar nature, yet they may require very different treatment on account of the local conditions being different. Good cultivation does not necessarily mean frequent workings, for there is such a thing as overworking a soil; that is, getting it into such a fine state that a heavy rain makes it run together like cement, and unless worked up immediately after the rain (which is only possible on small areas) it breaks up in a more lumpy state than when first worked. Disking before the first ploughing has a lot to recommend it in a limited rainfall area. Firstly, by breaking the surface and stopping evaporation, the ploughing can be continued so much longer in the event of a dry spell; secondly, the land breaks up more crumbly than when not disked; and, thirdly, the plough deposits the finer soil in the bottom of the furrow, leaving the rougher particles on the surface to be dealt with by the subsequent workings. If the nature of the land and condition thereof as regards moisture (being not too wet) permit of harrowing immediately after the ploughing, so much the better; for this is where there is such a loss of moisture on account of the extra surface exposed to the air. If these operations have been done under favorable conditions the weeds will soon necessitate another working; and it is here that one must use discretion in the choice of the implement, according to the nature of the soil. In any case the weeds must be effectually killed, but in one soil it will be necessary to leave a fine crumbly surface, in another a rough, cloddy surface. If the latter sort of soil were worked to fine tilth on top it would run together with the first rain of any importance, a crust would form, and evaporation take place so rapidly that much of the good of fallowing would be lost. Of course, it must be worked as soon as possible, and this is where the trouble lies. Continued rains mean continued working, and that brings about the fine state of surface that we want to avoid in this soil; and yet, if a loose mulch is not kept on top the rains in the summer months are not only lost, but are the means of a loss of the stored moisture. The soils that are subject to this drawback are, as a rule, deficient in organic matter, and until that is supplied it will always be difficult to know how to conserve the maximum amount of moisture without paying too dearly for it in cultivation. Two good heavy fodder crops would go a long way to lessen the evil; but, better still would be the adoption of a system wherein fodder crops which would pay their way as well as tending to make the stiffer soils more friable and consequently more easily worked and less liable to form a crust, play an important part. In the case of the lighter soils, more frequent working can be taken advantage of, as the cost is less and there is not the same tendency to cake; again, here the above practice can be well put into force, inasmuch as it puts more body into the soil, to say nothing of increasing its fertility. Providing care has been exercised in the depths of the different cultivations, by the autumn there should be a clean field, with 2in. or 3in. of loose fine, or comparatively fine, soil overlying a good solid seed bed, made up of fine particles packed together by the continual working above it, and in perfect contact with the unworked soil and subsoil, and ensuring the supply of moisture for the succeeding crop by capillary attraction from the reservoir below. It is possible to retain in this reservoir practically all the rainfall for the year by thorough cultivation, and if the subsoil is not of too porous a nature, make use of it for the plant. Very few fallows are so well worked that no weed seeds are ready to come away with the wheat, but by choosing the correct time for drilling in the wheat (that is, only drilling when the top mulch is too dry for small seeds to start in, the wheat being deposited in moist soil) it comes away at once, and unless rain falls within three or four days it will be far enough ahead to smother the weeds, except such as oats, turnips, and star thistles, which will force their way through any crop. Harrowing the growing crop is an operation well worthy of consideration in some cases." In replying to a question in regard to the harrowing growing crops, the writer of the paper said that the most suitable time for conducting that operation was from the present time until about three weeks hence, according to weather conditions. Crops should not be harrowed before the wheat plant had sent up its second leaf. The idea of harrowing was to break the top crust of the soil to stop evaporation in order to preserve all available moisture until the plant was well rooted and strong enough to resist a dry spell in the weather.

Mr. Lawrie agreed as to the beneficial effects of harrowing, especially in regard to crops on stiff clay land. Mr. Greig said that climatic conditions greatly influenced the farmer in his operations. He believed in the principles as advocated in the paper.

Redhill, July 1.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. F. Wheaton (chair), McAvaney, Lines, Hayes, Prevost, E. Steel, Stone, Holmes, Briggs, Pengilly, P. H. and F. A. Wheaton (Hon. Sec.), and one visitor.

SHEEP AND WOOL.—Messrs. P. Wheaton and Prevost contributed the following paper : —“That South Australia offers great advantages to the industrious man on the land cannot be denied. It is difficult to imagine a more prosperous class of farmers than those inside Goyder's line of rainfall in South Australia. There is no doubt that the carrying capacity of land since the introduction of artificial manures has been greatly increased. While on some farms, however, more sheep are kept than should be, others are found to be understocked. In the former case the result of the clip is generally disappointing. The clip from a small but well-conditioned flock realises more than a large scantily-fed one. It is all very well to keep a large flock in good years, but the bad seasons have to be reckoned with. The breeding of fat lambs for market is a source of revenue for the farmer in this district. The market in Europe is almost unlimited, and the breeder can always get a ready sale for his fat lambs. A matter of importance is the kind of ewe kept. For the purpose of fat lamb raising, no doubt the most profitable breed is the Merino, for not only do those sheep produce excellent lambs when crossed with the Dorset Horn or Shropshire, but their wool is always worth 50 per cent. more than that of any other breed. They will also live in bad years where other breeds will perish. It is a good practice for the farmer to pick out a few of his best ewes, i.e., those large framed and well covered with a good bulky wool showing a good length of staple, and mate them with a well-bred Merino ram, in order to keep up the standard of the flock. All old broken-mouthed ewes should be got rid of. Lambing ewes should be kept to themselves, and should not be unnecessarily disturbed. Whether the ewes be young or old, it is a good thing to frequently walk quietly through the lambing paddock unaccompanied by a dog, and give the assistance often required. This may save the lives of many ewes and lambs. It is most necessary, if farmers wish to get the best results from their lambs, that they should have an abundance of green feed. The ewes should be in good condition before lambing, in order that they may give the necessary sustenance to their offspring. Small paddocks are a great boon, as sheep can be frequently shifted; thus the pasture is always fresh. To get satisfactory results, one ram should be yarded with each 50 ewes for about eight or nine weeks. The dates when the rams are put in and taken out should be noted, so that one knows when the ewes have finished lambing. One hundred and fifty days is the pregnancy period of a ewe. It should be realised that the rams should not be put in too early or late. About four weeks after lambing has terminated is the usual time for earmarking and tailing all lambs and castrating ram lambs. For tailing the searing iron is preferable to the knife. The latter causes an unnecessary loss of blood, and the lambs tailed with a knife seem more susceptible to the blowfly pest. It is the general practice among farmers to shear their own sheep. Of course the blades are used mostly. Second cuts should be avoided, and it should be seen that the sheep are shorn clean. All sheep should be dagged before entering the shed. If a good price is expected for the wool, it is most necessary that it should be properly classed. Where the flock is all Merino, and is not very large, it is not advisable to make too many lots. Farmers should never class on quality, but on condition. All the fleeces which are extra greasy and heavy, as well as the yellow, discolored pieces, in addition to the belly wool, should be kept separate. All fleeces should be skirted before being rolled. With small flocks heavy skirting is unnecessary, but the sweaty and dirty edges should be picked off. If one or two burry fleeces are found in a flock, keep them apart from the balance of the wool. If a buyer sees them mixed, his estimate of the value is greatly affected. Farmers will find it bad policy to go in for breeding light, fine wool. If the flock is fairly large it pays to skirt off the breech, which should be branded as pieces. All dirty, poor, and irregular wool should be taken off. If a broken or tender fleece is found it is advisable to tear it up and put in with pieces. When the flock is large it often pays to divide the clip into several lots, but star lots should be avoided. Say, for instance, three lots are made. The first lot, which could be branded “A A” or “1st combing,” consists of the brightest, lightest, broadest-stapled, and most attractive-looking fleeces. The second lot, which would be called “A” or “2nd combing,” is a wool containing more yolk or

earth, and which is shorter and less attractive-looking than the A A's. Then a cast lot can be made, consisting of all the inferior fleeces, such as extra heavy, discolored, extra coarse, or in fact any fleeces which spoil the look of the other sorts. All crossbred wool must be kept separate. In classing Merino lambs' wool, all the shorter and heavier wool, from which the dags and stains have been taken, should be kept by itself. The long and hairy, and also burry wool, might be put with this lot. I hardly think co-operative classing would be a success, as it would lead to a good deal of dispute and dissatisfaction." Members agreed generally with the paper, which was much appreciated. The Shropshire ram was considered to be better than the Dorset Horn for the fat lamb industry. The Secretary drew attention to the fact that Southdown lambs had been tried with success at the Roseworthy Agricultural College.

Yongala Vale, July 27.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. A. C. Fowler (chair), W. Scott, F. Laubsch, T. Battersby, W. Edson, E. Cooper, W. and T. Keatley, B. Webb, G. H. Jansen (Hon. Sec.), and six visitors.

FALLOWING.—In a paper on this subject, Mr. Hunt, a member of the Whyte-Yarcowie Branch, said that the main objects of ploughing the land was to conserve the moisture and to secure an early growth of rubbish to be cut off, in order that a clean crop should be secured. The fallowing should be done early, as soon after seeding as possible, and the farmer should use that particular kind of plough which best suited his soil. The great advantage of early fallow was that it exposed the soil to the atmosphere for a longer period, and the heavy winter rains readily penetrated to the subsoil to be conserved for future use; moreover, it was easier to obtain consolidation of the seed bed. With late spring fallowing much winter rain was lost by evaporation and surface drainage. However, heavy red clay soils, which tended to break down rapidly under the influence of winter rains and which set very hard in the dry weather, should be left until the light soil was fallowed. A modification of the Campbell system of dry farming was being carried out in this State. This system required the harvester to be followed up by a double disc, but in South Australia the surface of the soil was so hard and dry at harvest time, excepting in limestone and sandy soil, that this was not practicable. The system of cultivating land to be fallowed in February and March had been adopted in the drier areas with satisfactory results. This enabled the autumn rains to easily penetrate the subsoil and also favored the germination of rubbish, which could be destroyed when fallowing. When deciding the depth to which to plough his land the farmer should be guided mainly by the character and depth of the soil. In America it was not an uncommon thing to plough to even 12 in. in the drier parts. In South Australia the average depth was probably between 3 in. and 4 in., and rarely did a farmer exceed 5 in. Deep ploughing was undesirable where the soil was shallow, or on limestone country. No benefit was derived by bringing clay subsoil to the surface. Generally, provided the soil was of sufficient depth, it would be found that deep working was better suited to dry districts. One of the objections raised to this was the time involved and the cost of the ploughing, but the extra return from the crop should more than compensate this. At Hammond, with an average rainfall of 9 in., deep ploughing experiments were tried. The returns from the land ploughed to a depth of 6 in. were over 3 bush. to 4 bush. more per acre than the return from plots ploughed 4 in. deep. The general rule was where the soil was naturally deep it was profitable to work deeply. The writer was of the opinion that deep ploughing had been discontinued by a number of farmers in the dry districts because they were unable to secure firm and consolidated seed beds. In wet districts this was an easy matter, as the heavy rains tended to break up the soil. The best means known of obtaining a solid seed bed was the use of the harrows, which should be put over the land as soon after rain as possible. It was practically useless to harrow heavy clay soils when they were dry, especially if they were at all lumpy, as this left the land open and very little moisture was conserved. He recommended the harrowing of fallow land as finely as possible to secure the germination of all rubbish and the conservation of as much moisture as possible. An interesting discussion followed the reading of the paper.

PLOUGHING IN STUBBLE.—The advisableness of ploughing in stubble was discussed, some members favoring the idea, whilst others were opposed to it. Attention was drawn to the fact that where the stubble had been raked together and burned it was clearly to be seen in the following crop where the burning had been done, even although the ashes had been scattered about by the wind.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Balaklava, July 13.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. H. P. Burden (chair), T. A. Thomas, P. Roediger, O. Uphill, H. M. Tuck, J. Spillane, H. L. Twartz, G. C. Neville, B. R. Bayer (Hon. Sec.), and one visitor.

STAR THISTLE.—Attention was drawn to the prevalence of star thistles in the district, and the possibility of successfully reaping crops dirtied by this weed was discussed. Mr. Thomas had found a "chopping comb" attached to the machine very useful.

BOT FLY.—The Secretary passed around for inspection a bottle containing a small portion of a horse's stomach and a quantity of bot fly chrysalides. The specimens had been removed from the stomach of a horse by Professor Higham several months ago. He read an extract from a veterinary work showing the remarkable vitality of the bot chrysalis, which lived for hours in oil of vitriol, corrosive sublimate, and other powerful chemicals. It was impossible, therefore, to give the horse anything that would destroy the chrysalis without injuring the stomach. Mr. Neville said if the hair were clipped from under the horse's chin and some of Professor Higham's mixture applied, that was sufficient to keep the fly away from the horse. Some of his horses are attacked every year, and others escaped. A man he had working for him used to tie a piece of red cloth under the horses' chin to keep the fly away. Mr. Spillane thought the keeping of the fly away from the horses was the best remedy. This could be done with working horses, but not with young stock running about, and these latter spread the bot fly. He had used carbolic salve with good effect. The Chairman said it was dangerous to go out with a harvester with some horses when the bot fly was about. He had always used Professor Higham's ointment and found it effective when put under the horses' chin.

Blyth, July 29.

PRESENT.—Messrs. A. L. McEwin (chair), Dunstone, Zweck, Ninnes, Roberts, W. Pratt, A. A. Schulze, M. S. Longmire, Clarke, Buzacott, Lehmann, Schuster, Podler, H. W. and W. O. Eime (Hon. Sec.), and one visitor.

LIMESTONE.—Mr. R. Buzacott, in a lengthy paper, stated that generally speaking the limestone on the scrub land in this district was hard, which made it more valuable, both for lime and road-making purposes. With the stones left as they were they constituted a hindrance to cultivation. If, however, it paid to crop the land with the stones on it, surely the work of clearing would be compensated by a handsome return. In addition to this there should be a direct return from the stones themselves. Continuing, the paper said—"I believe we have in these stones a valuable asset. There are no better stones in the State for lime-burning. The cost of burning would not be so great where the wood is on the spot. When Mr. A. L. McEwin had the Mallee Brao kilns in full swing the lime from there was very popular, and I have heard it said again and again that there was no better lime in the State than that burned at the Mallee Brao kilns. Another use for the stones in their raw state is road making. Our roads generally are not too good, and there should be a demand for good hard limestone, and you who are fortunate enough to have the limestone on your land should find it a source of revenue. The district council should be at all times buyers of stone suitable for road-making, so that the farmer coming into the town for his superphosphate or produce of any kind need not come in with an empty wagon, but every time bring in a load of stone. About the time when the phosphate is due to arrive at the railway station bring the team in with a load of stone to the council. This will save demurrage on your phosphate, save the expense of paying a man to unload, and save yourself the laborious work of loading from the ground. You will profit by so doing; so will the district council. I would suggest that the district council buy these stones by weight over the weighbridge at an upset price, saving time of measuring and of checking the several heaps delivered by the various farmers and carters at different times. When the council held their monthly meetings cartnotes could be presented and payment made. These stones could be placed on the three-chain road well off the track, and when broken they would be ready for distribution on the roads where they may be required. If our council and the farmers interested take the matter up, in 10 years' time our roads will be a credit to the district in which we live."

Freeling, June 28.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. F. H. Heinrich (chair), Morris, Kuhlmann, Shanahan, H. Mattiske, jun., Elix, Neindorf, Koch, Neldner, A. Mattiske, sen., and G. A. Block (Hon. Sec.).

HARROWING GROWING CROPS.—The majority of members favored the practice of harrowing the wheat crop after it had shown through the ground, but others dissented. A number of farmers in the locality were experimenting with the idea of ascertaining the effect of harrowing, and the results would be watched with interest.

POISONOUS BERRIES.—Mr. Morris drew attention to the fact that the berries of the white cedar were poisonous to horses, cattle, pigs, &c.

Gawler River, June 29.

(Average annual rainfall, 18 in.)

PRESENT.—Messrs. A. J. Bray (chair), J. and B. Hillier, A. J. Davis, C. Leak, W. J. Dawkins, W. Rice, Winckle, G. Higgins, F. Bray (Hon. Sec.).

NOXIOUS WEEDS.—A discussion on this subject was raised by Mr. A. Dawkins, who read an extract from a newspaper. Mr. A. J. Davis drew attention to the need of effective measures for combating noxious weeds, and thought the proposed appointment of inspectors by the Government was a step in the right direction. Mr. W. J. Dawkins said the difficulty was not so much in connection with the weeds on cultivated land, but on the adjoining roadsides and on waste land. There it was an expensive and tedious undertaking to eradicate them. Mr. Rice had found that the seeds of the saffron star thistle would lie dormant in the soil for a number of years. Oats was the best crop to put in where this weed was prevalent, as the crop would outgrow and choke the weeds. Where wheat was planted the weeds found little difficulty in securing a footing, and when cut off by the binder at hay time they shot out again and produced perhaps a dozen flower heads where there had previously been one.

Gawler River, July 29.

(Average annual rainfall, 18 in.)

PRESENT.—Messrs. W. Rice (chair), A. J. Davis, G. Higgins, E. F. Winkler, Richter, J. H. and W. J. Dawkins, J. Hayman, F. Bray, H. C. Dunn, A. M. Dawkins, B. F. Hillier (Hon. Sec.), and two visitors.

LIME.—In a discussion on the subject of adding dressings of lime to the soil, initiated by the Hon. Secretary reading an extract, Mr. A. M. Dawkins said that heavy red clay responded most readily to lime, and this was important, as this class of land had not responded in the same way to fertilisers as the stone land had. Its action on the salts of phosphate perhaps meant more than was generally recognised. Mr. Hayman drew attention to the excellent results which had followed the application of sea shells to the claypans, and Mr. J. H. Dawkins said such soil had been much benefited at the Roseworthy Agricultural College by the addition of limestone rubble.

Greenock, June 29.

PRESENT.—Messrs. W. Roenfeldt (chair), G. O. Tümmel, B. Schultz, R. Tummel, J. Jungfer, E. Handke, C. Liersch, A. Nitschke, B. Nitschke, H. Koch, F. G. Pfeiffer, L. A. Traeger, E. Bockmann, O. Semmler, R. E. Radford, P. Gehling, E. Geyer, O. Krüger, W. B. Siebo, V. Koschade (Hon. Sec.).

IMPORT DUTY ON SUPER.—The proposal that a duty should be imposed on imported manures was discussed at length, and the Branch decided that such an action would be detrimental to the interests of agriculture.

HORSES.—Mr. P. Gehling read a paper on this subject, in which he drew attention to the unreasonable treatment which horses often received at the hands of inexperienced and cruel drivers. Very frequently animals were overdriven at a fast rate, and such treatment was to be severely deprecated. He advocated breaking in horses when they were young, but it was a mistake to pet them, as this frequently led to stubbornness when the time came for breaking them in. If the horse could be brought to understand that its master was also its friend more satisfaction would be got from it. It was a mistake

to use a whip too frequently, as this made the horse nervous. Particular care should be taken to see that the harness fitted, and that it was well cleaned and oiled. The linings of the collars should be occasionally washed with a disinfectant, and the accumulation of sweat, dirt, and hair should be removed. Horses should be well combed and brushed, as this opened the pores of the skin, and it would be generally found that a well-groomed horse kept in good condition and required less feed. The animals should not be put to heavy work immediately after a long spell, but they should be gradually accustomed to it. When they were sweating, after work, they should be well rubbed down. At the mid-day meal the animals should have the collars removed and their shoulders should be carefully brushed. This would go a long way towards obviating sore shoulders.

Saddleworth, June 21.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. R. G. Townsend, F. H. Eckermann, A. J. Caskey, H. Graham, W. Scales, P. Manning, and F. Coleman (Hon. Sec.).

FALLOWING.—In a paper on this subject, Mr. A. J. Caskey recommended the adoption of the three years rotation, if sufficient land to permit of its being carried on were held; otherwise alternate cropping was advisable. It was essential that the fallows should be got on to early; this resulted in the conservation of more moisture for the following season. Red land should not be ploughed whilst it was wet or soft. When ploughing, ridges and furrows which tended to wash into creeks or deep gutters were to be avoided; 3½ in. to 4 in. was a sufficient depth to which to plough red land; black land, however, could be ploughed to from 4 in. to 5½ in., the furrows being from 8½ in. to 9 in. wide. Three or four weeks should elapse between the ploughing and the time the harrows were run over the land, when it should be worked down to a fine tilth. Cultivation should not be to a depth greater than was necessary to kill the weeds. The harrows could not be used too often, and after harvest the roller should be put over lumpy or rough parts. Immediately weeds appeared the cultivator should be brought into requisition. In discussing the subject, some members favored deep ploughing, even to touching the subsoil, a very little of which worked down with the soil in the cultivation by the scarifier would do good. The use of gypsum on the clayey portions of the wheat paddocks was recommended for trial.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Minlaton, July 13.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. R. H. McKenzie (chair), E. Corroll, T. Giles, S. Vanstone, J. Martin, W. Bennett, and J. McKenzie (Hon. Sec.).

ELEVEN YEARS AS HON. SECRETARY.—Appreciative references were made to the fact that the Hon. Secretary (Mr. J. McKenzie) had carried out the secretarial duties of the Branch for a period of 11 years, during which time he had done much in the interests of the Agricultural Bureau.

ANNUAL REPORT.—The Hon. Secretary read his annual report as follows:—“In placing before you the 22nd annual report of this Branch, I am sorry to say that it has been one of the poorest years on record. At the last annual meeting we had 12 members; at present we have 13. We have held seven meetings, with an average attendance of four. Four good papers have been read and discussed. I have to thank the members who read papers. They have done their duty, but the discussion has been disappointing

to them on account of the poor attendance. As this meeting has been called to bury or reorganize the Branch, I wish to put before you what I consider some of the reasons why our Branch is not more successful. The members do not realise their duties. It is, in my opinion, a privilege as well as a duty to belong to the Bureau. The member that drops in once in two or three months to see what is doing is no good to any Branch. I want the members to understand that the Bureau is supported by the taxpayers, and is one of, if not the, best agricultural institution in the State. Members, as you know, are proposed by the Branches and approved by the Advisory Board, which is appointed by the Government. A person should consider that he owes a duty to his country when he becomes a member. The Advisory Board is guided to a great extent by the opinions of Branches, and often the Government is guided by the Advisory Board; therefore, when one becomes a member of the Branch one's influence can be used right through the State. Remember that the taxpayers' money is being spent on you as advisers of the State. The Hon. T. Pascoe considers the Bureau as being a most important factor in the improvement in the agricultural methods in South Australia. Professor Lowrie says the Bureau enables the department to ascertain what the farmer most needs, and many other authorities say that it is a most valuable institution. There are about 132 Branches; about 20 more than there were last year, and the members get the opinions of experts on various subjects, and scores of suspicious plants are identified by them. Some farmers say they can get the *Journal* for 1s. per year and get all the information. Quite true; but if they were all hangers on, where would the information come from? They are satisfied to sit quietly by and get the result of the other fellows' brains for nothing. Members! be up and doing. There is work for all, and our country needs our help. In our district we should have a real live Branch with 25 or more members if the members put the right spirit into the thing. Alter the time of meeting to evening. Do anything; but do not let the Branch die for want of energy. Try to get the young men to join. We go into recess in harvest and seeding because we have not time to attend meetings; yet, I venture to say, if a football match were held in the middle of harvest almost every member would be there. At this time of the year nearly every Saturday is taken up with football. Perhaps we could alter the time of meeting to some other time or evening. I see that some of the recently formed Branches have as many as 60 members. If half that number attended they would have a good time. If a member, when writing a paper, knew that there would be 15 or 20 there to hear him, he would endeavor to give them his very best, and would himself benefit by the exchange of opinion. I see no reason why this Branch should give up. I think it would be a distinct loss to the district, and the members would fall short of their duty to the district, to the country, and to themselves. Remember that we are living in one of the most progressive parts of the State, and our opinions are sought after and valued by many new settlers in other parts. It is also very evident that the opinions are sought after and valued by all our officials and by the Government. A few extracts from the history of the Branch may be of interest to the present members. The Branch was opened on January 4th, 1890. Mr. Tonkin presided and Mr. C. Smith was Hon. Secretary. I notice Mr. S. Vanstone was present at that meeting, and this gentleman has been one of our best members. Mr. Smith was secretary for two years, Mr. Jas. Correll for nine years, Mr. Mayer for three months, and the present occupant has carried out the duties for 11 years. There have been about 52 members of the Branch. I am of the opinion that members should have the objects and the constitution of the Bureau read occasionally at their meetings. The last paragraph of this pledges the Branch to do everything in its power to carry out the objects of the Bureau. I would also suggest that the officials be asked to have the objects and constitution printed in the *Journal* continuously. In conclusion, I would urge on members that the only way to make the meetings successful is for every member to come to the meetings prepared to discuss any or every subject that is brought forward, and come prepared to introduce a subject every time. If we consider we have nothing to learn, then there is more reason why we should teach others. Surely we are not going to keep our knowledge to ourselves. We would only be doing our duty by letting the world know that there is a limit, and that we have reached it."

Pine Forest, June 27.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. D. Carmen (chair), G. Inkster, A. Nelson, C. Schultz, W. Attenborough, S. Barr, A. Hewett, and R. D. Goodridge (Hon. Sec.)

SHEEP ON SMALL HOLDINGS.—In a paper on this subject Mr. D. Carmen said that if fat lambs were to be profitably raised they must be well fed, and it was therefore better

to have the farm somewhat understocked than otherwise. A lamb that received a check in the early stages of its growth would never make a prime freezer. It was a mistake to feed off the paddocks too bare, and he would prefer to have some dry grass left to shelter the young grass after the rain had caused the seed to germinate. The Shropshire cross would be found to be more easily fattened than the Merino, but against this was the price received for the wool of the latter, and the deduction which had to be made for the number of rejects in the former. Four to six tooth ewes should be bred to four-tooth rams. At this time of the year especial attention should be paid to the sheep: there should be water in every paddock, and frequent changes of pasture were necessary. Lambs should be tailed when they reached the age of two months. Well cared for, they should be ready for freezing at five months. In discussing the subject, Mr. Inkster said he preferred the Shropshire cross for fat lambs, as they grew faster, and any reject could be made use of on the farm. Mr. Hewett favored the Lincoln cross. Mr. Schultz advised the growing of green feed, such as peas and maize to top the lambs off. Twenty acres of peas would very materially assist in fattening 200 lambs.

WESTERN DISTRICT.

Elbow Hill, June 29.

PRESENT.—Messrs. Cooper (chair), E. Wake, H. and L. Wheeler, C. Jacobs, E. Story, G. F. Wake (Hon. Sec.), and two visitors.

FIELD TRIALS.—In a paper on this subject Mr. Jacobs said the chief benefit of field trials was that they gave agriculturists the opportunity of comparing the efficiency of various implements. It was generally found that insufficient time was allowed for the satisfactory completion of arrangements in connection with the trials, and the writer was of the opinion that arrangements should be taken in hand 12 months before the date fixed for the trial. The co-operation of Branches in this connection was likely to be productive of better results than generally followed the efforts of a single Branch to carry out a trial. The Hon. Secretary thought little good resulted from field trials, as most of the implements which were worked were just out of the factory, and they were attended by an expert during the competition. It was reasonable to expect any implement to do good work under such circumstances. Mr. E. Wake thought more good would be attained if the Branches were to give better support to the agricultural shows.

Green Patch, July 1.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. F. Gore (chair), G. Sinclair, J. Sinclair, sen., C. Parker, E. Chapman, C. J. Whillas (Hon. Sec.), and one visitor.

MANURES.—The following paper on this subject was contributed by the Hon. Secretary:—"The reactions that take place in the soil in connection with the growth of plants are very complex and are not yet all thoroughly understood. However, enough is known of them to greatly aid the farmer. Experience and field tests are also necessary to determine the most profitable system of treatment for each different soil, crop, and climatic condition. Fertility is in a great measure due to the power of a soil to retain plant food. The presence of humus, iron oxides, clay, and lime all greatly assist this power. Virgin soils are generally rich in plant foods; but when the crops from these are continuously taken off the soil, a time soon arrives when it pays to return at least a part of the plant food required by the crops grown. The excrements of the men or the animals consuming the crops would, of course, be the most complete return to make, but under farm conditions this can seldom be profitably done, whereas it has been found that returning by

chemical manures some necessary portion of the plant food required is often highly profitable. Experience shows that the most profitable chemical manures to use in this way are nitrogen, potash, and phosphates. For cereal growing under Australian conditions, experience and thousands of field tests have shown that the phosphates are the only payable plant foods to add to the soil. Australian soils, aided by the climate and the system of working, apparently keep up an abundant supply of potash and nitrogen. The latter is also probably helped by the clovers growing on the soils. In a dry climate, well-worked bare fallow increases the available nitrogen in a soil by the absorption from the air and rainwater of nitrogen compounds, and by the oxidation of these compounds and of the humus of the soil. This oxidation is due to the action of bacteria, which require warmth, access of air to the soil, and a little moisture. It changes the nitrogen compounds to a form that can be taken up by the plant rootlets. Apart from this, working the fallow breaks up the soil particles, make more available other plant foods, and gives the plant rootlets better access to these foods. The available nitrogen is present in a very soluble form, and bare fallow on a light soil with a heavy rainfall will result in a serious loss of nitrogen. A clay soil has more power of retaining its nitrogen. Most soils contain an abundance of plant foods, but generally only a very small portion of this is in a form available to the plant. Tilling the soil increases this portion, and the addition of a small quantity of necessary available plant food may help to start the plant and put it in a condition to attack and make use of some of the less available plant food in the soil. A fertile soil may, in the top 9 in. contain phosphates equivalent to many tons per acre of super., and still require the addition of a little water soluble super. to grow a crop. Superphosphate, the most important manure to the Australian farmer, is mainly a mixture of monocalcic phosphate with gypsum (calcium sulphate) and impurities derived from the original mineral. It is manufactured by treating very finely ground phosphoric rock (insoluble tricalcic phosphate) with sulphuric acid, resulting in water soluble monocalcic phosphate and gypsum. In practice some of the phosphate is left unchanged, otherwise the manure would be too acid, and, therefore, sticky and poor running. If the super. is kept for any length of time there will be some reversion to a citrate soluble form, unless there is an excess of sulphuric acid at the start. Some of the imported manures apparently are made too acid to prevent reversion, and hence their stickiness. Should the original rock contain oxides of iron or alumina there will be a reversion to a citrate soluble phosphate in proportion to the amount of these impurities. Citric acid has about equal solvent power as have the organic acids formed in the soil by plant roots, and is therefore used as a standard for commercial purposes. The citrate soluble phosphate of a manure is of considerably less immediate value to the plant than the water soluble phosphate. The percentages quoted by super. manufacturers are given in terms of tricalcic phosphate, 36 per cent. super. meaning that the manure contains 36 per cent. of tricalcic phosphate rendered soluble. This would be equivalent to about 17 per cent. of phosphoric acid. It seems to me it would be less confusing to give the percentages in phosphoric acid. Almost all soils have great retentive powers for phosphates, and losses by leaching will not take place unless the soil is quite destitute of humus, iron, lime, or clay. The water soluble super. drilled in the soil is, with the first moisture, changed to a citrate or an insoluble form. However, the chemical action that takes place so subdivides and distributes it through the soil particles that it is easily available to the plant. No methods of mechanical grinding and distribution could possibly put an insoluble phosphate in the soil in a form so available to the plant as is done by this chemical action; i.e., first the dissolving of the phosphate in water, and then the precipitation of it again in the soil as soon as it comes in contact with the necessary base, such as the compounds of iron, &c. Experience proves that it is only the water soluble super. that is of immediate benefit to the crop, and as in many cases there is ample insoluble phosphates already in the soil, it would appear hardly profitable to add an insoluble phosphoric manure. However, some soils may be short of phosphates in any form, and here heavy dressings of insoluble very finely ground phosphoric manures would no doubt prove profitable in the long run. Thomas phosphate is a bi-product of the basic process of steel manufacture from pig iron containing phosphorous. It is practically a mixture of tetracalcic phosphate and quick lime. It is greatly used in England and Europe, costing about 40s. per ton for 16-18 per cent. soluble phosphoric acid, and perhaps 20 per cent. of lime. This phosphate is very finely ground, and is as available practically to the plant as monocalcic phosphate, also benefiting many soils by the lime which it contains. The following are some of the effects of adding quicklime to a soil. On a soil destitute of lime it would supply a necessary plant food. It makes more available some of the plant foods already in the soil. On acid soils it neutralises the organic acids in the soil, i.e., sweetens the soil, stimulates the action of useful bacteria in the soil, and improves the physical condition of both clay

and sandy soils. However, there is often ample lime in a soil, and Australian experiences do not, I think, show much benefit from liming. Regarding field tests for manures on wheat crops, I have carried out a number during the past seven years. I found that mineral super. and Thomas phosphate give about equal results. Guano is of little use to the immediate crop. Lime, potash, and nitrogen manures show no benefit whatever to the crop. I prefer 36 per cent. super. to any of the lower grades. These tests were in a deep sandy loam over clay subsoil, with an average rainfall of 26in."

Kopplo, June 27.

(Average annual rainfall, 17in.)

PRESENT.—MESSRS. G. B. Gardner (chair), T. Brennand, H. Thompson, J. Newell, G. and M. Howard, T. R. and M. T. Gardner (Hon. Sec.), and two visitors.

CARE OF WORKING HORSES.—The Hon. Secretary contributed the following paper :—
 "At this season of the year most farmers are busily engaged tilling the soil, and during the period extending over sowing operations the horses have to do the hardest work they are called upon to perform. To enable them to go through the work quickly they should be in good condition and in good heart. They should have at least two months' spell after the harvesting work is finished, and should be fed a little every day, even when not working. I prefer good wheaten hay, chaffed, with a fair amount of corn ripened in it. If Small's Early variety is available, so much the better. When horses are working hard they should be well and regularly fed, and should have not less than 35lbs. of chaff a day with 3lbs. of oats and 2lbs. of bran in the 2lbs. of chaff at dinner time. If they are kept well, one hour's actual feeding time should be long enough for dinner, provided the feed is rich and good. One hour and a half should be allowed for feeding before they are put to work in the morning. They should be allowed to go to water fairly often, and it is better to provide a trough than to turn them loose into a waterhole or dam. In the winter time especially, they should be provided with a warm dry stable, and I would rather have them all loose with the run of a good sized yard than tie them up. The collar plays an important part in the horse's work, and they will work far better in collars that fit them than in those that have to be packed up with bags. A mistake is often made when purchasing collars in not allowing for the horses losing condition. Collars should be cared for. Horses will not work so well in strange collars, and often contract sore shoulders when a new one is put on them. I prefer check-lined collars, stuffed with horsehair, which should be repaired immediately they become ragged. The farmer should be able to reline his collars with a piece of bag and stuff them as required. Too much care cannot be given the team when working on rough land. If the teamster is a careful and experienced man he is always on the lookout for small things that may get out of order in connection with the harness." A good discussion followed the reading of the paper. Several members thought oat chaff better than wheaten chaff for feeding horses. One member thought 3lbs. of oats rather much for one feed, and would distribute that quantity over the three feeds. Mr. Brennand expressed the view that less trouble would be experienced with sore shoulders if steel collars were used.

Miltalie, June 28.

(Average annual rainfall, 14½in.)

PRESENT.—MESSRS. J. P. Story (chair), T. W. and E. Story, E. P. Smith, A. R. S. Ramsey, J. S. Jacobs, T. A., A. M., and M. H. Wilson, H. R. Jacobs, F. Alm, P. G. Wilson, F. Jacobs, W. E. Hier (Hon. Sec.), and four visitors.

EXPERIMENTS ON THE FARM.—The paper on this subject, read by Mr. P. G. Wilson, and printed on page 1292 of the July issue, was discussed. Mr. T. A. Wilson stated that though analyses of soil were very useful, the farmer could only definitely decide the strength or weakness of his land by actual experiment. Mr. J. S. Jacobs believed the depth of ploughing should be determined by the soil. When it was not too wet, fairly deep ploughing should be the rule. Land intended for fallow could advantageously be worked in March with light implements. Mr. E. Story thought it necessary to sow thickly in wet districts, and thinner in drier parts. These and other matters could be determined by the farmers conducting tests on their holdings.

FARM OUTBUILDINGS.—Mr. T. F. Alm contributed the following paper :—"My attention has often been drawn to unsightly old sheds which are allowed to remain on farms. For several reasons I prefer a shed with a straw roof. It tends to keep a more even tempera-

ture than is the case with an iron roof. The former will be found far more serviceable on a stable, as it will be warmer in the winter time and cooler during the summer months, which is most important. Of course, in a country with a low rainfall and an insufficient water supply, an iron roof will be found most serviceable. When building a stable for horses I would procure forks 8ft. 6in. long for the front and back rows, and put them 1ft. 9in. in the ground. The inside row of forks should be 2ft. higher, in order that the water may be run off. The forks should be placed 12ft. apart; this provides stands for two horses. If possible, I would build a shed with good mallee rails instead of pines, as the latter are more liable to break when dry. Cover the roof with 6ft. netting wire, as it will keep the straw smooth; the wind cannot do so much damage, nor can the fowls scratch holes in it. If a roof is secured with ordinary fencing wire it will become uneven, and water will run in and rot the straw. It is advisable to have the shed facing the east, as there is less likelihood of rough weather from that quarter. The harness room should be in a position convenient to the stable, so that the horses can be harnessed while they are still feeding. The harness should be hung up on pegs in the wall, instead of over a rail, as is usually the case. The collars have to be opened every time they are hung on and taken off the rail, and they are thus more likely to be broken. Time and labor will be saved if the chaff is handy. The implement sheds should be built on a fairly level piece of ground, as it is generally a nuisance to get implements in and out of a shed if it is on the side of a hill. A large barn is also needed in which to stack the seed wheat and manure. I have frequently seen the seed wheat provided with no shelter whatever. The barn should be built with a stone wall and a good concrete floor, and it could then be partitioned so that the wheat could be emptied out of the bags. The mice generally cause a good deal of damage to the bags when they are stacked. The men's room is very often in a very dilapidated state, and more attention should be paid to this than has been the case in the past. If better accommodation were provided, there would not be such a scarcity of farm labor. If an iron building 12ft. by 10ft. were erected, and lined with matchboard and a fireplace provided, this should make comfortable quarters for two men."

Petina, June 29.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. W. Penna (chair), F. Barnes, J. H. Wharfe, E. Keeley, D. T. Kenny, C. J. Howard, J. Bascombe, G. A. Newbon, W. H. Howard, W. Kieley, J. Souter (Hon. Sec.), and four visitors.

SCRUB FARMING.—An interesting paper on this subject was read by Mr. D. T. Kenny, in which he dealt with the hardships that the scrub farmer encountered. The trouble experienced in securing a good stubble burn and the depredations of the rabbits were factors which exercised the landholder very considerably. A great deal of difficulty was usually experienced in securing a water supply, and often when tanks were built they would not hold.

BUCKBUSH.—Mr. Kenny said that buckbush stacked at the proper time made good feed. The method of stacking adopted was to place a layer of straw on the ground, on this a layer of buckbush, then again a layer of straw, until the stack was finished. A farmer in the Murat Bay district had used this for fattening ration sheep with good results. Members generally agreed that, stacked at the proper period of its growth, buckbush was a good fodder.

Shannon, June 29.

PRESENT.—Messrs. W. Proctor (chair), J. Fleming, M. Cronin, H. Proctor, L. A. Wilkins, W. Wemyss, C. Wemyss, M. T. Cronin, W. Williams, F. Proctor, V. G. Gordon, J. J. Cronin (Hon. Sec.).

TREATMENT OF HORSES' SHOULDERS.—The following paper was read by Mr. W. Williams:—"The horse is the mainstay of the farm, and it is the duty of every driver to see that it is well cared for and well fed and that the harness is well looked after, so that the animal may work in comfort. To keep a horse's shoulders free from sores from one year's end to another is a difficult matter, and very often it is more than the ordinary driver can do. Prevention is better than cure, and we may keep very close to the spirit of this old proverb by carefully following a method something after this style, which in

my experience seems to be well worth the carrying out: Keep the horses' shoulders well brushed every morning and dinner time, so that no dry sweat and matted hair collect together. Do not use branbags under the collars; spend a few shillings on leather false collars and keep them well oiled with first-grade neatsfoot oil. Procure Fairplay hames with sliding draught, so that you may be able to adjust the hame hooks to an even height and give an even pull to each shoulder. Remember that one hook an inch higher or lower than the other will cause a lot of trouble, and it is almost impossible to cure a sore shoulder under these conditions." In discussing the subject Mr. Fleming said that the use of the branbag in the collar was not altogether to be despised, as he had tried it with very good results. Mr. Wilkins preferred leather false collars, which he would keep well oiled with raw linseed oil.

Utera Plains, June 29.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. A. Ramsey (chair), A. Venning, W. Gale, T. C. and H. C. Hornhardt, G. and A. Barber, G. Bilney, W. Stephens, J. and M. Abrook, N. Guidera, Fraunack, H. T. Hornhardt, M. Hunt, H. Hill, F. H. Harwood, G. Brinsley, W. Lee, P. Sinclair, R. Hill (Hon. Sec.), and a large number of visitors, including ladies.

PAPERS FROM THE "JOURNAL."—Five members read as many papers from the *Journal of Agriculture*, and a general discussion followed each. Speaking of horse-breaking, Mr. Venning thought colts broken in with the open bridle were not so timid as those broken to winkers. Mr. W. Gale thought the stripper the best implement to use when mousing a young animal. Other members preferred to put the animal in the drill for this part of his education, as he then learned to turn both ways. One member spoke of the value of a blacksmith's shop on the farm. He had had one for four years, and it had been a profitable investment. Farmers who had sons should send one of them to work with a smith for a few months to pick up some wrinkles in the business. Knowledge thus gained would be of service again and again.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Forster, June 22.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. W. Searle (chair), J. and G. Searle, J. G. and R. Whitfield, F. Johns C. Hayman, T. Retallack, W. J. Sears (Hon. Sec.), and two visitors.

USEFULNESS OF THE BUREAU.—Mr. J. Searle expressed the opinion that the Agricultural Bureau was doing very little good, as members attended the meetings, discussed various subjects, but did not put the ideas gained there into any practical effect. Mr. J. G. Whitfield thought the Bureau was a splendid institution. A great deal of information was secured from the *Agricultural Journal*, especially by the young men. Mr. Searle said through the medium of the Bureau members secured an insight into the methods adopted in other parts, and could compare these with their own, and follow the most economical. Mr. Hayman had learned more about agriculture at the Bureau meetings than anywhere else.

Lameroo, June 29.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. J. Troubridge (chair), O'Connor, Leckie, Lehman, C. R. Eime, Thyer, Sinclair, Ross, Kain, Batten, A. J. A. Koch (Hon. Sec.)

DAIRYING.—Mr. S. R. Sinclair read a paper on this subject, in which he expressed the view that if systematically carried out dairying should be a profitable venture in this

district. The first essential was to secure a pure-bred bull from a cow of known milking strain. If possible a few pure-bred cows should also be secured, but where this could not be done the bull would in time improve the herd. The best cow to keep was the Jersey, as this animal did well and yielded a liberal supply of milk. It would be found that the cows of this breed would stay in milk right up to the time of calving, but it was advisable to dry them off a month beforehand. The Ayrshire was a very good milk and butter cow, and it had the advantage of being larger than the Jersey. It would be found more saleable when the milking period was over. It should not be forgotten that the cow should receive enough good feed to keep her in condition, as well as to provide for the drain on her constitution in connection with the milk yield. Lucerne should be grown, and enough hay should be carried to provide feed right throughout the year. Crushed oats should be mixed with chaff, and this could be damped with molasses mixed with water. The feeding should be done regularly, and the animal should be given as much as it would eat without any waste. Proper housing accommodation should be provided, and although the cows could be rugged for protection against the weather, it would be found that it paid better to spend this money in the purchase of timber and iron for shed-building. In discussing the paper Mr. A. Ross said he preferred Holsteins for this district, as they were more hardy than the smaller cows. Mr. C. R. Eime had used crushed wheat with hay and chaff, and found it a good milk-producer. Mr. O'Connor pointed out that during the drought period some years ago the dairying industry was the mainstay in a great many instances around Hawker, where many farmers entirely gave up wheat-growing. In Denmark co-operative breeding was practised, and many advantages were gained by it. Mr. W. M. Thyer was of the opinion that these parts were rather too severe for the smaller and more delicate breeds of cows, and thought the Ayrshire-Holstein cross would suit admirably. Mangolds chopped up and mixed with molasses made excellent food. Mr. E. J. Troubridge was of the opinion that regularity was the essential feature in connection with dairying, and it was immaterial what breed of cows was kept so long as they were good.

Monarto South, June 29.

PRESENT.—Messesrs. A. P. Braendler (chair), B. Hoff, R. S. McDonald, R. E. Anders, E. Tillbrook, J. G. H. Paech, J. and H. Frahn, F. C. Thiele, G. A., E., and R. Hartmann, G. Patterson, C. F. Altmann (Hon. Sec.), and eight visitors.

RABBIT-PROOF FENCING.—Mr. E. Tillbrook, in a paper on this subject, stated that before rabbit-proof netting was put on to a fence care should be taken to see that the posts of the latter were in good order, and that new struts were put in wherever necessary. All the wires should be tightened and a barbed wire should be run along the top. Forty-two inch netting of the 1½ in. mesh should be buried in a trench to a depth of 3 in. or 4 in. in light soil, or 2 in. or 3 in. in harder land. The end of the netting should be fastened to the strainer with ½ in. large-headed nails, and a fork handle or crowbar could be used to unroll it, care being taken that it was tightened as it was being put up. At every interval of 3 ft. the netting should be fastened to the top wire with small galvanized wire. Where a rabbit-proof fence was to be erected 3 ft. 6 in. posts could be put in at a distance of 30 ft. apart and two T-iron standards put equidistant between these posts, the flat side of the standards being kept towards the netting. At intervals of 200 yds. strainers should be put in. Where, however, big cattle were to be provided for posts should be put in 21 ft. apart, with one iron standard between them. One barbed and three plain wires should be used. The former should be on top, with the first plain wire 4 in. below it. The lowest wire should be placed 12 in. from the ground. Mr. McDonald favored the 1½ in. mesh, as small rabbits would get through the 1½ in. and again stock the ground that was netted off. Instead of putting it in a trench he preferred to lay about 4 in. or 5 in. of the netting on the surface out towards the rabbits, and pack it down well with stones. As rabbits would always burrow close to netting that would prevent them getting down. Members agreed with Mr. McDonald's views, and although the method was the most expensive, it was considered the most effective. Mr. R. E. Anders read the paper on the destruction of rabbits which appeared on page 1085 of the May issue of the *Journal*. Three months (the time specified in the Rabbit Destruction Act) was, in his opinion, too long for the simultaneous destruction of rabbits, as some landholders started at the beginning of January and others left it till the end of March, thereby practically compelling their neighbors to kill their rabbits. The general opinion was that one month was quite long enough. As it was necessary that the rabbits should be destroyed during the first three months of the year, while the grass was dry, it should be left to the district councils to fix the month for the respective districts. February was most suitable for this district.

Monarto South, July 27.

PRESENT.—Messrs. A. P. Braendler (chair), B. Hoff, J. G. H. Paech, E. Tilbrook, F. C. Thiele, G. Gogol, B. J. and H. Frahn, G. and R. Paech, A. Schenscher, R. S. McDonald, C. F. Altmann (Hon. Sec.), and four visitors.

WHEAT-GROWING.—Mr. F. C. Thiele supplied the following estimate of the cost of wheat-growing in the district. The value of the property was estimated at £5 per acre, a 5 per cent. rental equalling 10s. The following items were allowed for:—Ploughing, 4s. per acre; twice cultivating, 5s.; twice harrowing, 1s. 6d.; drilling, 2s.; rolling, 6d.; super., 4s. 6d.; seed, 3s. 6d.; harvesting, 4s.; cornsacks, 2s. 6d.; carting, 1s. 3d.; depreciation of stock and implements by 10 per cent. of value, 5s.; making a total of £2 3s. 9d. On an average crop of 15bush.. sold at 3s. 6d., the income would be £2 12s. 6d., which, after deducting the cost of production, viz., £2 3s. 9d., left a net return of 8s. 9d. per acre. The cost of producing 1bush. of wheat was 2s. 11d. In discussing the subject some members expressed the view that the costs estimated in the paper were too high, and that a 15-bush. crop should leave a bigger profit than 8s. 9d.; but the majority were of the opinion that the cost of working the land as stated by Mr. Thiele was a fair average for the district. It would be interesting to have the opinions of farmers in other districts, with a view to comparing the cost of production of the wheat crop in different localities.

Monteith, July 6.

PRESENT.—Messrs. Travers (chair), Rowan, Connell, Ferris, Clark, Wells, Smith, Martin, Frazer, Bradford, Magor, Gunn (Hon. Sec.), and nine visitors.

THE MILK SUPPLY FOR ADELAIDE.—The following paper was read by Mr. Rowan:—“I have no hesitation in saying that the milk supply of the city should be under Government control. Purity should be the hall-mark. The dairyman and the consumer alike should have the independent assistance of a chemist and bacteriologist, and if such were provided greater confidence would be gained in the supply and a keener demand created. In South Australia, with its warm climate, the introduction of modern methods of improving the milk supply is sadly needed; but the consumer gives no encouragement to the farmer to improve the quality. The attitude is to favor cheapness, and the householder forgets that as a staple food milk has a marked variability in composition and feeding properties. In the nourishment of infants no special precautions are taken to meet the requirements of health, and no doubt many deaths take place through the neglect of parents to provide against the introduction of infant diseases contracted through the agency of impure milk. Aeration of milk is especially necessary in the country, and the introduction of a suitable appliance has been strongly recommended in order to demonstrate to milk suppliers the necessity for the aeration of milk directly after the milking process. The Lawrence cooler is very useful, water being used in this for the cooling. It takes off all the animal heat, and adds six hours keeping quality, which is of great value where milk has to travel by road or rail. Considering the prices obtaining in Adelaide, the producer should receive not less than 1s. per gallon for his milk.” A number of demonstrations in milk-testing were given by Mr. Rowan, which were greatly appreciated.

Moorlands, June 28.

PRESENT.—Messrs. L. Spurr (chair), J. Schubert, R. Neumann, A. H. and E. Miatke A. Oppatt, A. Maczkowiach, R. Spurr (acting Hon. Sec.), and one visitor.

IMPORT DUTY ON SUPER.—Considerable discussion took place concerning a proposal recently made that an import duty should be imposed on superphosphates. A resolution was unanimously carried protesting that such action would seriously damage the producing industries of the State.

LIMING LIGHT SOIL.—An extract on this subject was read by Mr. R. Spurr. In discussing the matter he explained that in this district there was a considerable amount of limestone available, which could be utilised if a little time were spent in burning the lime. Mallee roots were also there in abundance to provide the necessary fuel. There was a vast difference between limestone and carbonate of lime, and he thought the former in its natural state had no effect, whereas, if it were burnt and slaked it would undoubtedly be beneficial to the soil in this district. Mr. Oppatt thought that more would be done

by the application of nitrate of lime than would be the case if carbonate of lime were applied. The former was much quicker in action than the latter, and he was conducting extensive experiments with nitrate of lime with the idea of ascertaining its effect.

Parilla Well, July 4.

PRESENT.—Messrs. J. E. Johnson (chair), J. and W. Flavol, D. and J. Ferguson, E. H. Leak, H. Leak, J. W. Johnson, G. and B. Pahl, T. Burford, F. Foreman, L. G. Neville (Hon. Sec.), and three visitors.

CARE OF FARM MACHINERY.—Mr. J. W. Johnson read a paper on this subject, in which he drew attention to the necessity of carefully tightening and oiling machinery directly it was received. Sand would be found to work into the bearings unless care was taken. A machine that was composed partly of wood should be protected from the influence of the weather, as difficulty would be experienced with the wood warping and twisting. Wherever practicable the farmer should erect an iron shed for his machinery, and on wet days his time could be well spent in cleaning and repairing. The woodwork should be frequently painted, and this applied especially to wagons and drays. Every farmer's outfit should include a small set of blacksmith's tools, with bellows or a portable forge, an anvil, drills, tongs, iron-cutters, round and flat iron of various sizes, together with such other tools as were found necessary. The handy man could soon learn to save a good deal of trouble and expense by straightening tyres, drawing shares, making S hooks, eyebolts, &c.

Parrakle, July 27.

PRESENT.—Messrs. F. J. Dayman (chair), C. E. Hammond, R. L. Beddome, W. Threadgold, A. C. Hamiester, R. F. Brinkley, A. J. Beelitz, M. J. Kildea, N. Good, O. Heinzel, F. W. Randall, A. F. and F. S. Dayman, J. G. Temby, H. Denver (Hon. Sec.), and seven visitors.

TREATMENT OF VIRGIN SOIL.—Mr. A. S. Johncock read the following paper:—"New land, especially in the mallee districts, has a tendency to sourness, which must be removed before any hope of growing an average crop can be entertained. Where the landholder has green scrub it is a comparatively easy matter to sweeten the land, but when there are three or four year old bushes and dry sticks from the last fire, it is a very different proposition. In the first instance the fire will do practically all the sweetening required, but in the second nothing but thorough working will do it, and there is a considerable amount of work required where sticks, low bushes, and green undergrowth prevail. My opinion in regard to working the land is, always to fallow it the first year, using a share plough. The plough not only turns up the soil better than cultivators, but it also pulls out a considerable percentage of the stumps in addition to pulling out, or at any rate, breaking the thin roots which are near enough to the surface for it to get hold of. Plough about 3½ in. or 4 in. deep, throw the ground up as roughly and as loosely as possible in order to allow the sun to play on it, and to allow the air to penetrate it thoroughly. Want of air is very frequently the cause of this sourness. Other causes are the various acids which get into the ground from the scrub and undergrowth. Fallow early, and so give as much time for the land to sweeten as is possible. If it is a stiff clayey land it will always pay to give it a dressing of lime, this will help the sweetening, keep the ground loose, and also act as a manure. Cultivate the fallow as late in the spring as can be managed. Make the top as fine as possible. The finer this is worked the more moisture will be conserved. For this reason I favor harrowing fallow. The harrows will leave a smoother surface than a cultivator, and we must have a fairly even and finely-worked surface to stand the heat of the summer and conserve moisture. The more the harrows are used the better will be the results. Cultivate about 2½ in. deep for a seedbed, always taking care not to cultivate as deep as the land was at first ploughed. Leave what is underneath for the next ploughing to turn up. If the crop is sown dry, harrow behind the drill. This method, carefully carried out, will insure a satisfactory yield, always supposing the atmospheric conditions are favorable." The majority of members favored the use of the share plough. It was a good plan to cultivate and harrow after ploughing, and rather than crop new land which had not had a good burn the first year, it should be fallowed.

COMMENCING FARMING IN THE PINNAROO DISTRICT.—The following paper was read by the Hon. Secretary:—"I would start work on a mallee farm in the Pinnaroo or Loxton district by erecting a galvanized iron house, just large enough to live in, and a shed to store chaff, super., &c., in. The next thing would be to get a water supply. I should put the bore down and case it with strong galvanized downpipe, soldering all the joints as I put them down. This only runs into about one-third the cost of steel casing, and is just as durable. A windmill and pump are necessary. I do not believe in engines of any kind for pumping water for stock or domestic use. No matter how economical they are they run into a considerable expense in a few years, while the windmill costs practically nothing. I would then get a team of bullocks and a roller and a truck or two of chaff and roll as much of my block as I could, getting over the best land first. If possible, I would roll the whole block, excepting the tops of sandhills and a few patches for firewood and shelter. I would then sell the bullocks. If I had all or nearly all of my block rolled I would have no trouble with clearing burnt scrub. Everyone who has had to clear some of that knows the labor and expense attached to it. If fortunate enough not to have my scrub burnt by scrub fires in summer, I would burn about 400 acres, selecting a good hot day with a fairly strong north wind. I would then get a team of six horses and a Gaston Duplex 12-disc cultivator and a 17 or 19 disc drill and disc the solid ground, and as soon as the rain came would go on drilling and put it in, using about 40lbs. of super. to the acre. About 300 acres of wheat and 100 acres of oats would be the crop. After seeding I would pick the stumps and rubbish off 40 or 50 acres for hay, and erect a fence around the crop. I would cut as much hay as possible the first year, as a bit to spare is better than not enough. I prefer the harvester, and would use a chaff carrier and save as much of the cocky chaff as possible. When mixed with oats it makes good feed and helps the haystack to last out longer. As soon as wheat-carting was finished I would fire rake the stubble. I have a fire rake 25ft. wide, and would not recommend a small one to anyone. The larger the rake the quicker it gets over the ground, and it does much better work by keeping a larger fire going. I would then burn another 400 or 500 acres of the scrub left from last season, and treat it in the same way as that cropped the previous year: but would sow the oats on the stubble ground. If I had only one team, the second year I would fallow that portion of the stubble land not sown with oats, using the disc cultivator and going over it several times before harvest. The greatest drawback in this district is the scarcity of horsefeed, but if plenty of oats is grown and cocky chaff saved, in addition to a fair quantity of hay cut, the expense will not be so great. I would not recommend anyone to bring old horses here. Rather have them on the light side, if studying expense. If the scrub were burned the first year, I would simply drill it in. The second year I would sow half of it after disking well, and after seeding would fallow the remainder." In discussing the subject, some members thought it inadvisable to roll more than 500 acres, as difficulty would be experienced in controlling the shoots on a larger area. Mr. Temby would roll as much as possible and would fallow that which he could not put under crop the first season. He would use horses for rolling, and a stripper and power winnower for harvesting. The Chairman favored getting rid of the scrub as soon as possible, and would fallow that portion which he could not crop. If there were plenty of grass, &c., about, he preferred using bullocks for rolling; but if he had to feed them he would rather use horses. The harvester was best for taking off the crop. Mr. Hammond would use horses for rolling. In replying, the Hon. Secretary said it was better to get the scrub down than to have a lot of black sticks to deal with. Burnt scrub was expensive to clear. If a man had more land cleared than he could crop and fallow, some of his neighbors would, no doubt, be pleased to put it in. It was safer to use bullocks for rolling scrub, for if an animal were accidentally killed, the loss represented would be only about £8 or £10, whereas if a horse were destroyed the loss would be nearer £30.

Pinnaroo, June 22.

PRESENT.—Messesrs. B. L. Harfield (chair), F. G. Bonnin, H. E. Dibben, F. H. and K. Edwards, H. Fewings, L. M. Ferguson, F. Hunt, H. C. Hill, W. H. Kelly, H. Ledger, C. Lee, J. Lethaby, F. Laycock, M. McCabe, B. H. Nash, E. H. Parsons, W. Venning, Geo. and W. Wilson, P. H. Jones (Hon. Sec.), and one visitor.

HOW TO IMPROVE THE WORK OF THE AGRICULTURAL BUREAU.—The papers on this subject read at the last Annual Congress were read and discussed by members. It was generally admitted that homestead meetings and the wheat-growing competitions—the plots of which could be inspected by members—were far more beneficial and interesting than the holding of social evenings as a means of varying the year's programme.

WHEAT-GROWING, ETC., WITH THE AID OF ELECTRICITY.—Mr. F. H. Edwards remarked that he had read of experiments in this respect, and asked for enlightenment, if any of the members had been closely following the subject. Mr. Parsons had read that the scheme was worked by means of duplicate cables and connecting wires by means of which the current was supplied to the ground. The Chairman mentioned experiments which had been made in a greenhouse. The application of electricity to the roots had, besides hastening the growth of the plant, greatly increased the yield. He promised to look up further information to place before members at the next meeting. Mr. Ledger understood from what he had seen in print, that the ground could be supplied with the necessary electricity for a few pence per acre.

Pinnaroo, July 27.

PRESENT.—Messrs. B. L. Harfield (chair), A. W. Burman, F. G. Bonnin, J. Docking, H. E. Dibben, F. H. and P. J. Edwards, L. M. Ferguson, W. H. and W. A. Kelly, H. Ledger, C. Lee, J. Letherby, F. Laycock, M. McCabe, B. H. Nash, E. H. Parsons, H. I. Reed, J. Scales, P. H. Jones (Hon. Sec.), and one visitor.

MALLEE COUNTRY FARMING.—Mr. H. Ledger read the following paper:—"Since the Pinnaroo district has demonstrated its productiveness there has been an eagerness on the part of a good many people to secure a block of land and start on their own account as farmers, and it must be admitted, judging from the experience of last season, that a good many have not fully counted the cost, nor do they fully realise what capital is involved in starting a farm in new mallee country. It is not my intention, and the idea is farthest from my thoughts, that this paper should suppress any man's intention to go on the land. On the other hand, I think every man who is willing to give his whole time and energy to subduing this class of country should be encouraged and helped, as every acre properly cleared is a valuable asset to the country. There are, in my opinion, two very important questions one should consider—'Am I adapted for the life?' and 'Have I enough capital?' If both can be answered in the affirmative then success should naturally follow; but, if a man likes the town better than the farm, or if all the capital he has is in his muscles, he will not succeed. It is wonderful what a man can accomplish by hard work and good management, but the man who cannot rough it and put up with a few difficulties should not entertain the idea of mallee farming. As to the amount of money required I am here giving a few figures. I am taking a crop of 300 acres. One person can manage this, providing water and things in general are fairly handy. £20 for Government fees and preliminary expenses; £60 for rolling, and I should suggest getting someone on the spot to do this if possible; £180 for horses. Six young horses should be got together for the money. The majority of old horses are dear at any price. £40 for cultivator. I am of the opinion that a tine cultivator is the most suitable for a man starting. I do not in any way wish to say that the cultivator is better than the plough if time and expense are put out of the question. £40 for drill; £60 for seed; £30 for super; £80 for chaff for six horses for six months. I strongly advocate getting chaff from a clean district, as it is evident that the rubbish that is sometimes brought as chaff is giving a good deal of trouble already, and it should be everyone's endeavor to keep down pests in the shape of weeds. £100 for buildings, stable, and camp; £20 for a vehicle. A tip-dray is always handy on a farm, and a wagon that would suit for a year or so may be available. I am not in favor of spending elaborately when means are limited. £25 for fencing. This usually consists of one barbed wire and posts half a chain apart. £40 for rations, &c., making a total of £695. I have made no mention of harness; but rail expenses and contingencies may be safely put down at £100. With a 12-bush harvest, and wheat at 3s. 6d. per bushel, the return from 300 acres would be £630, a deficit of £65 on the expenditure, without any allowance being made for the cost of taking off the crop, &c." In discussing the subject, Mr. Nash suggested the purchasing of second-hand machines, which could often be procured at prices far below those quoted in the paper. In the winter months a farmer might well employ his time and team by doing road work and other such jobs, and so add to his earnings. Unless a farmer possessed sufficient capital to commence and work a farm in a thorough manner it was a wise step to let it on the share system. Mr. P. J. Edwards pointed out that the loss would not be so great as the figures indicated, for such items as horses, rolling, fencing, &c., were assets, and consequently would not appear among the debits in the following year's returns. Then again, the farmer might possibly have been able to cut sufficient hay and so do away with the purchase of horse feed. Mr. F. H. Edwards would not recommend the purchase of second-

hand implements. The mallee was by no means a poor man's country, and he thought £1,000 little enough to start farming in such districts as this. Many had been successful on less, but then they had been favored by good seasons. Mr. Bonnin was of the opinion that the writer had rather underestimated the costs. Mr. Ledger, in reply, drew attention to the fact that there were various other expenses which were items to be considered when one was hard pushed. He emphasised the necessity of always securing young stock.

Wilkawatt, June 27.

PRESENT.—Messrs. J. Ivett (chair), D. F. and D. Bowman, J. W., F. W., and G. A. Altus, T. and C. Sorrell, E. W. Brooker, A. V. Ivett, A. J. McAvaney, F. and B. Spackman, W. R. and M. Neville, F. W. and W. H. Gasmier, H. H. Pritchard, R. Sinclair, B. Tylor, P. Maher, P. Rigney, W. J. Tylor (Hon. Sec.), and four visitors.

RATE.—A cutting from a newspaper on this subject was read by Mr. A. V. Ivett. Members discussed at length the advantages of feeding rape to cows, and it was stated that if bran and rock salt were provided no taint would be noticeable in the milk.

FENCING.—Mr. D. Bowman, in a paper on this subject, said the best fencing posts for this district were made from sawn timber. Care should be taken that the holes for the wires were not too small. Wooden posts should be placed 18in. in the ground, with the strainers 2ft. 6in. in. Struts should be placed against the top of the strainers, as they would then better serve their purpose. For a boundary fence he would put in one wooden post and then four T-iron posts 10ft. apart. The top wire should be put up first and the other wires should be placed at reasonable distances apart, so that there would be no danger of the stock getting their heads through. In reply to a question, the writer of the paper said that a $\frac{3}{4}$ in. auger could be used for the posts and a $\frac{1}{2}$ in. auger for the strainer. Mr. Neville was of the opinion that it was better to put the struts near the bottom of the strainers, but the majority of members were of the opinion that this was not very secure.

Wilkawatt, June 29.

PRESENT.—Messrs. J. Ivett (chair), D. F. and D. Bowman, J. W. and F. W. Altus, C. and T. Sorrell, E. W. Brooker, A. V. Ivett, A. J. McAvaney, F. and B. Spackman, W. R. and M. Neville, F. W. and M. H. Gasmier, H. H. Pritchard, R. Sinclair, B. Taylor, P. Maher, J. W. Taylor (Hon. Sec.), and five visitors.

MALLEE SHOOTS ON GROWING CROPS.—The question as to whether cutting mallee shoots just before rain on a growing crop would be detrimental to the wheat was replied to by Mr. J. Ivett, who stated that if the shoots were large and the rain brought the tan out of them the growth of the plant would be affected. Mr. M. Neville thought shoots cut whilst rain was falling damaged the crops.

DRAKE.—Mr. M. Neville was experiencing trouble with drake coming up on fallow land which was just being drilled. Mr. J. Ivett advised putting sheep on to the land, and Mr. A. J. McAvaney thought the best plan would be to run the harrows over it immediately.

* STABLE MANURE ON GROWING CROPS.—In reply to a question as to whether any harmful effects were likely to follow the spreading of stable manure on growing crops, Mr. Sorrell stated that no harm would be done provided the ground was not dried too quickly by the sun afterwards.

POULTRY.—The following paper was read by Mr. A. J. McAvaney:—"It would be to the interest of farmers to keep a poultry yard on their farms, as with a little care a good profit can be made. I prefer keeping mixed breeds, White Leghorns being a good laying variety, and easily reared, should be in the majority. I would also keep a heavy breed for table purposes. In this district, where the water is plentiful, it is advisable to sow a small plot of lucerne, as this a splendid feed for fowls during the summer months. They are very fond of it, and it is better than other green feeds. All otherwise waste food can be utilised and converted into cash." A good discussion resulted. One member favored the keeping of a cross between White Leghorn and Dorkings. Members generally believed in the idea of growing lucerne for fowls, as it was preferable to crushed bone, &c.

TAKEALL.—Mr. J. Ivett read a paper on "Takeall and How to Control It," as follows:—"Takeall is one of the greatest pests with which the farmer has to deal. There are two practical ways of eradicating the disease, one is clean fallowing, and the other a suitable change of crop, such as oats or rape. The disease can be readily recognised, as portions

of the crop become blighted or withered: the green plants turning greyish-white, and in some cases being entirely destroyed. A distinguishing feature of the disease is that it occurs in patches of all shapes and sizes. On making an examination of the diseased plant it will invariably be found that the base of the stem has a brown or black discoloration. Takeall is found most frequently on old, continuously worked land; but it also appears on fallowed land and on new land fallowed and unfallowed. Careful and thorough methods will effectually stamp out the disease. It is recognised that it is a fungus which is reproduced from year to year by means of spores left in the ground from the previous crop. Whilst there are any spores in the soil the disease is likely to appear in the wheat crops growing in that soil. The only practical method of cleaning the land is to allow, and if possible to assist, the spores already in the soil to germinate, at the same time preventing the fungus from maturing and thus reproducing fresh spores. This can be done by killing it by starvation. As the fungus cannot obtain its food directly from the soil, but must obtain it by living upon wheat or certain other plants, it can be killed by preventing the growth of such plants. This, of course, necessitates a change from wheat-growing for a while, and it also means that the fallows must be kept free from plants on which the disease might thrive. It is known, for instance, that takeall will live on barley, barley grass, and spear grass, and probably on other plants, but it is also regarded as established that the fungus will not live upon oats or upon rape. The constant working of the soil brings to the surface fresh spores which germinate, and, in the absence of food, perish. The farmer who cannot afford to lose a year should certainly plant oats or rape. Even in this way the pest may prove a blessing in disguise, for it may serve to convince some that a continuous cropping with wheat may increase and spread the disease, while a change of crops will check it, and clean fallowing will most likely stamp it out altogether." In reply to a question, Mr. Ivett said that if takeall lived on drake it would kill it. Several members stated that where wheat had died through takeall drake still lived.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, June 25.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. W. Chapman (chair), T. Jacobs, J. Lewis, J. Tozer, C. Lewis, A. Broadbent, G. Hicks, H. Jacobs, H. Lewis, E. Broadbent, A. R. Stone, T. Jacobs, jun., J. Mildwater, S. H. Curnow (Hon. Sec.).

THE CULTIVATION AND WORKING OF HILL SOILS.—A paper on this subject was read by Mr. E. Broadbent, in which he discussed the most profitable means of working the soil in the Hills. In view of the limited size of the holdings it was essential that the very best use should be made of every available space. The man who was content to treat his soil in a haphazard manner could not expect to reap a good harvest. It was generally the practice for the landholder to devote the greater part of his time to the flats, and the true value of the hillsides was not recognised. To work any class of soil satisfactorily it was necessary to fallow early, and this applied to the hillsides. He would plough to a depth of 7in. or 8in. and leave the ground in the rough state until the end of the spring. Then the cultivator could be run over it, and the harrows could follow during the summer. This would leave a nice smooth surface and assist in conserving the moisture. The roller could be put over the ground at this stage with advantage. He believed that, tried over a number of years, the above system would be found profitable. When fallowing during a dry season the cultivator could be put over the soil, and a nice seedbed would be the result. Consequently the seed would germinate immediately and not remain under a clod for a week or so, as was frequently the case when other methods were adopted. Mr. T. Jacobs, in discussing the paper, said the chief difficulty in connection with the working of the hillsides was the loss of valuable soil through heavy rains washing it away. Mr. Stone agreed with the contentions of the paper writer, and thought that in the past the value of the gully soil had been overestimated. This dried up quickly in the summer, whereas the hillsides retained their moisture for a longer period. Mr. Curnow drew

attention to the fact that the retention of moisture was governed to a large extent by the presence of humus in the soil. Where there was plenty of humus the soil was not likely to dry up so quickly, as it could be reduced to a finer tilth. He recognised, however, that many of the flats were constituted principally of black clay. This of course cracked and liberated the moisture. Mr. Jacobs said this class of land should be treated with gypsum, lime, and salt.

Kanmantoo, June 29.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. W. Downing (chair), H. E. and W. Shepherd, R. and S. Downing, R. T. Critchley, L. Wooley, W. Mills (Hon. Sec.), and one visitor.

FARM IMPLEMENTS.—The following paper was read by Mr. L. Wooley:—"Considering the high price of machinery, there is no better investment for a farmer than that of providing sufficient shelter to protect his machinery from the weather. It is not absolutely necessary that implements constructed of iron or steel should be under cover, because they can be painted occasionally to prevent them rusting. Every farm should be provided with a good supply of bolts, so that breakages can be promptly and properly attended to. If machinery has been travelling over rough roads the operator should tighten all nuts, and see that everything is in perfect working order before starting. The neglect to take these precautions will often result in a great deal of delay and expense. The seed drill requires considerable attention; and a good cover should be thrown over it at night. Before starting in the morning it is advisable to try the feeders, to see if they work freely, because, if sticky manure is used it will probably have become set during the interval, and the feeders will require cleaning. It is also necessary that a tarpaulin should be thrown over the binder to protect the canvas, while the belting of strippers and harvesters should receive similar attention. After the season's work is completed, all grease and dirt that has accumulated should be removed; a little kerosene may be used to facilitate the operation. This is also the proper time to overhaul and repair machinery for the coming season. Just after working a machine a person is better able to decide just what parts need adjusting than he would be after the machine had been put away for a while. This practice would also avoid any loss of time through inability to obtain parts of the machine quickly. The oiling of machinery is a very important matter, and the operator should not be neglectful in this respect. If he overlooks any of the oil cups it means that the machine is allowed to run dry, and this is the most frequent cause of breakages. It is advisable to use a little at a time and often, for if too much is applied at once there is not only a waste but a tendency for dust and dirt to accumulate, and this will gradually work into the bearings. Other points to be observed are—the oiling of all leather belting, the painting of woodwork, &c. Frequent painting of machinery can be avoided to a considerable extent if the covering mentioned herein has been provided, as the greater part of machinery required on the farm is only in actual use a few days or weeks in the year. Of course, vehicles should be painted every three or four years. The tying of wheels should be entrusted to capable tradesmen, because a good wheel can be easily spoiled through bad tying. The best materials for erecting sheds are iron and stone. Taking all things into consideration iron is less expensive, besides making very attractive outbuildings when properly finished."

Lyndoch, June 27.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), J. Mitchell, H. Schrader, E. J. R. Woolcock, J. Woolcock, H. Klaube, H. Springbett, P. N. Burge, H. Kennedy, W. F. Haese, and J. S. Hammat (Hon. Sec.)

OIDIUM.—Mr. J. Woolcock read the following paper:—"Oidium is a mould that grows exclusively on the outer tissues of the vines, and attacks only the green organs of the plant, viz., young shoots, buds, leaves, tendrils, flowers, berries, and stalks. It appears first as a dirty white efflorescence, extending like a thin film, and possessing a characteristic mouldy smell. After the attacked wood has become ripe and hard, the imprints of oidium may be seen as dark-brown patches on the surface of the bark, which is not gnawed through as in the case of anthracnose or black spot. The wood is liable to dry up in winter, and should never be selected either for cuttings or as scions for grafting. Very often the

invasion occurs after blossoming, and in that case it mostly attacks the leaves and bunches. Should it appear early, and unless proper attention is paid in due time, it will cause the flowers to abort. The tender leaves are the first and the most seriously attacked, the disease showing preferably on the under surface. Its meshwork of microscopic shreds or filaments spreads around them, and they soon shrivel and dry up, while their full power as organs of evaporation and of assimilation of some of the constituents of the air is seriously impeded, and the must of grapes coming from affected vines is never so rich as in the case of well-matured and healthy grapes. It is the berry, however, that the fungus seems to most particularly cherish. They are either entirely or partially covered with a whitish greasy powder which at first can be rubbed off without leaving any trace, but which, after a few days, when the powdery mould has taken a greyish tint, leaves, when rubbed off, little black specks on the surface of the skin. The effect of the fungus on the skin is to tighten it and prevent it from stretching, so that the berries either dry up or burst open. The ripening does not progress satisfactorily, the berries assume a dull and sickly color after they have turned, and are none too good for making wine, as they have a mouldy taste. Oidium as a rule flourishes best in localities where the atmosphere is generally warm, moist, and muggy, while it is not so troublesome in a hot and dry climate. Again, some varieties of vines are more susceptible to the disease than others, and the vinegrower should watch in the spring and early summer for possible invasions. All vinegrowers are acquainted with oidium, and a great majority know that sulphur is the best remedy for the pest. A great many, however, may not be aware that there is a form under which sulphur is more active for that purpose, and also that the state of the weather and the time of day when the application is made have a direct influence upon the efficacy of the remedy. Atmospheric conditions have a considerable influence over the growth of oidium. A warm temperature favors its growth, but great heat, such as when the thermometer rises up to 95° Far., stops the progress of the fungus, which actually dies out when the temperature reaches 113° Far., though its debris, when the circumstances become favorable, soon cause a new invasion. It is often noticed, especially in warm districts, where the temperature close to the surface of the soil is very high owing to the radiation of heat, that the lower leaves, as well as the bunches that hang pretty low, are free from the disease, while on high trellises under similar circumstances, it is seen to blight the vine and wither the crop. Experiments conducted in all parts of the world have conclusively demonstrated the action of sulphur against oidium, and powdered sulphur, as well as flower of sulphur, is now used everywhere. It is not necessary, moreover, to bring the particles of sulphur into immediate contact with the spores and fungus threads to effect their destruction, as the fumes which this substance in a fine condition emits at elevated temperatures, and especially by exposure to the sun and heat, are the only active agents of destruction of the mould. Under the action of heat the sulphur is oxidised, and sulphurous acid is formed, which is an efficient insecticide and mould destroyer. That action, it has been noticed, is more pronounced when the sky is clear and without clouds than in a diffused light. In places where the temperature of the soil rises as high as 110° Far., spreading the sulphur on the ground under the vines is sufficient to accomplish the destruction of the fungus. Sulphuring, to be efficacious, must be used as a preventive. If the treatment is delayed until the formation of the fruits of the fungus it is not likely to do much good, for, although it may destroy the mycelial threads, the seeds of the fungus are too well protected within their hard coverings to be injured by the application. The best time for sulphuring is early in spring, when the shoots are 4 in. long; then again just about the time of blossoming, as however well the applications may have been made, it is almost certain that some of the terminal cells of the mycelial threads, swollen and filled with a transparent granular matter, will escape destruction. These, with spores brought from other vineyards, may bring a new infection in about three weeks time. At this period the blossoms may be rendered sterile by the threads of the oidium covering the newly-expanded flowers and causing them to abort. A third application should be made a few days before the turning of the berries. In wet seasons, or in a moist district, as many as five and sometimes six sulphurings may be necessary, and no hard and fast rule can be laid down for each application. The person in charge should use his judgment and sulphur more especially the varieties most subject to oidium until the pest has completely disappeared. There are many ways in which it can be applied, i.e., by a piece of branbag held by the four corners and shaken over the vines, a dredging box similar to a flour dredge, or a sulphur bellows. The bellows are most widely used, and most effective, as the operator can get at the underside of the foliage where the disease will appear first. Last season I saw some very bad cases of oidium on vines, and the owners did not know what the trouble was. It was then too late to apply the sulphur with a view of saving the fruit.

BERSEEM.—Mr. H. Springbett tabled a bundle of berseem which had grown to a height of 10in. This Branch had purchased and distributed during the last week in March, 1912, 2cwt. of seed of this clover and 12 persons had experimented with it. In nearly every case the result was a failure. The seed germinated very irregularly, and the greater proportion of the young plants died. Mr. Springbett had irrigated a piece of ground and then ploughed it. Thirty pounds of berseem was sown on April 4th on sandy soil. Lucerne planted alongside was making much better growth. Seventy-nine days from the time of sowing the plot stood 10in. high, and it had been watered twice since germination. The water used was from a well containing a percentage of magnesia that suited lucerne, but which was too strong for vegetables. Many foreign weeds were growing in the crop. Mr. Linke had sowed a few ounces of seed in his garden, which he irrigated with water from the Barossa reservoir. The height of the plants was from 13in. to 15in. and the crop appeared to be doing well. The Hon. Secretary drilled in 12lbs. of seed on April 11th, and also 8lbs. of lucerne and 1bush. of barley alongside. The soil was a loose loam, moist, but not irrigated. Of the berseem a few patches were from 2in. to 3in. high; 60 per cent. to 70 per cent. of the seed did not germinate until May 28th or 29th. The lucerne crop was uniform, of better color, and appeared to be doing better than the berseem. The barley had reached a height of from 15in. to 18in. It was generally remarked that owing to the climatic conditions of 1912 this fodder had not been a success in this district.

MacGillivray, July 23.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, A. Burfitt, J. Matthews, A. Stirling, sen., A. Stirling, jun., H. J. Wiadrowski, and H. C. Williams (Hon. Sec.).

CARE OF HORSES.—Mr. Burfitt contributed a paper on this subject, in which he drew attention to the fact that the proper provision of feed and water was the essential point. He found that between 8lbs. and 9lbs. of good hay chaff with a little bran added was a very fair ration. Each horse should be well cleaned down at least once a day, and where the prevailing atmospheric conditions were cold it was necessary to rug the animals when they were in the stable. The arrangement of the digestive system of horses pointed to the necessity of small feeds being supplied often, and this also applied to water. Each animal should be provided with a well-fitting collar, and where sore shoulders were prevalent, blacklead and lard could be applied. The medium draught was the best animal for farm work, as it did not eat so much as the larger horses. Every farmer should keep a stock of common medicines on the farm in case of emergency. Discussing the subject Mr. Stirling, sen., said he would water horses immediately after working, even though they were hot. He watered his horses either before or after feeding. Prevention of sore shoulders was better than cure. It did not necessarily follow that big horses were big eaters. He favored horses with weight rather than medium sorts for team work. Mr. Ayris deprecated rugging. For sore shoulders he used a false collar, which he kept well oiled and smooth. Horses should have water whenever they chose to drink. Mr. Stirling, jun., considered bran to be three times the value of chaff for feed. Mr. Wiadrowski believed in grooming each horse regularly whilst in work. Unless an animal was in a lather, a cold drink would not injure it. The danger of colic attacking horses that were driven through cold water when they were hot was instanced by the Secretary. Other members disagreed that this could have been the cause. He believed in warm stables without pampering the horses. A horse comfortably stabled during cold weather thrived better on a given quantity of fodder than it otherwise would. The Chairman had noticed that at a time when sore shoulders were prevalent horses that had molasses fed to them were not troubled, presumably because they were thereby kept in better health. Every feed should be cleaned up before more was given. An opinion was expressed that colic was sometimes caused by a change to green feed after a course of dry ration.

Meadows, July 1.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. G. Ellis (chair), T. B. Brooks, J. Stone, A. L. Ellis, W. J. Stone, F. Nottage, H. A. Kleemann, S. Smith, W. H. Bertram (Hon. Sec.).

THE CITY MILK SUPPLY.—Mr. A. L. Ellis read the following paper:—"Dozens of persons who used to keep one or two cows in and around the city and supply several of their neighbors are now compelled to do away with their cows altogether, owing to the expense which would have to be incurred in connection with the Food and Drugs Act. Of course.

this causes a greater demand from the man who has the milk round. Within a very short time the city and suburbs will have to depend on the country for the supply of milk. There is no substitute yet discovered for milk, and the demand will continue to increase if our capital city takes the same rapid strides that it has during the last 20 years. During the past six months one of the largest milk retailers in Adelaide has been depending almost entirely on the country for his milk supply, visiting Woodside and Gumeracha districts daily and taking delivery at the farms. Of course, getting the milk to the city will have to be done by motor power, where there is no railway, otherwise it will not be profitable owing to the time involved. In Victoria there is a special milk train for the Melbourne supply run from the Gippsland districts. In the near future the milk producers will not have to go to the factory, and there will be no separators to attend to. According to the price the retailer gets for his milk, 2½d. a pint (nearly as much as the producer gets for a gallon now), he can well afford to give 6d. or 8d. a gallon to the producer for his milk if the present rates continue. To those who go in for milk production on a large scale and with an up-to-date plant, this will be a good return. Unless a cow will bring in more than £12 or £13 a year she is not worth keeping. It costs as much to keep a bad cow as it does a good one. To keep cows in good condition they must have good feed and plenty of lucerne, mangolds, and ensilage for winter feed. People make a great mistake by depending too much on what nature provides in the spring time. Good stalls and sheds are essential. With these there is no feed wasted, and every cow has what feed is given to her. A cow will comfortably consume 100lbs. to 120lbs. of grass daily, so it is little wonder that there are such a lot of poor cattle in the country when one looks around to see where they have to find their food. The milk industry will encourage the keeping of heavy milkers rather than the rich creamers, because it is quantity that will tell. The milking Shorthorn strain crossed with Jersey and Ayrshire breeds should make a good milking herd. The southern districts will play a prominent part in supplying the city with milk. We have the country, and it must be made more productive than at present, and cows will be the best means of doing this." In the discussion that followed, the Chairman considered it would be more profitable to sell the milk right out at 6d. or 8d. a gallon than retain the skim milk from the separator or factory for feeding the pigs. The Hon. Secretary contended that it was the labor problem—holidays, Saturday afternoons, and Sunday work—that hampered the dairying industry at the present time, and unless the owner of a small dairy farm was prepared to do most of the work himself he would not be able to make it a success. Mr. Jacobs considered that the labor problem would work itself right in time, and that if the industry would not pay at the present ruling rate of wages and hours, a person would not keep any more cows than he and his family could attend to.

Morphett Vale, July 16.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. A. C. Pocock (chair), L. F. Christie, sen., F. Rosenberg, T. Higgins, A. Anderson, H. V. Sprigg, W. Goldsmith, H. O'Sullivan, E. Perry, L. R. Christie, and E. E. Hunt (Hon. Sec.).

EARLY OR LATE SEEDING.—Mr. E. Perry read the following paper on this subject :—
 "On the small farms in the south, where most of the land cropped is fallow, a great many of the farmers sow far too early. In my opinion fallowed land should not be sown until at least 10 days or a fortnight after a good rain—an inch at least—as by then the weeds will have started and can be killed before sowing. Far stronger and healthier plants than that sown under dry conditions, which will produce cleaner and heavier hay, will be grown. This will always sell, even when hay is plentiful. By sowing before the rain, unless the land is free from weeds (which is very uncommon about here), one is certain to have weedy hay, as there always seems enough moisture for weeds to grow. In fact, I have seen stuff (I cannot call it hay) cut at the local chaff mill, the seed for which was sown before the rain, that was not fit to give to horses that were working hard. Another reason for later sowing is that black rust seldom badly attacks crops that have been sown under favorable conditions. If the rains are very late, like the present season, and it is getting late for a good growth of hay, it would pay the farmer to even change his seed and sow English or Cape barley and peas, which would pay far better than a poor crop of hay, especially now labor is so dear. Further, he would not be carrying all his eggs in the one basket. If the south is to keep its good name as a producer of the best quality hay the farmers will have to discontinue seeding in the middle of summer and patiently wait for

the season to break. The anxiety they have had lately will make them more cautious in the future, as dearly-bought experience is always best." Members discussed the paper at length. It was a difficult matter to determine when to sow in the case of a season like the present. Where late sowing was practised it was necessary that the ground should be carefully prepared.

Mount Barker. June 27.

(Average annual rainfall, 30·96in.)

PRESENT.—Messrs. H. N. Bell (chair), J. B. Paech, J. Brinkley, Jas. Cleggett, R. Hollamby, R. H. Grimes, S. J. Bishop, J. E. Smith, F. Simper, J. Thomas, A. Ferguson, J. Woolley, D. Wollaston, C. G. Braendler, E. Schmidtke, J. Hender, P. Davis, H. Jones, Bert Pope, J. Pope, A. C. Daw, A. P. Herbertson, D. L. G. Monfries (Hon. Sec.), and one visitor.

THE ONION.—Mr. F. Simper read the following paper:—"The onion is one of the oldest vegetables known. It is gaining favor year by year, therefore, it is necessary to increase the production to meet the demand. With a certain amount of knowledge and labor there are times when fair profits can be made by growing onions. In a district such as ours, where many of the holdings are small and the land expensive it is necessary to combine agriculture with gardening by growing root crops. From the outset, I wish it to be strictly understood that these remarks on onion culture are intended only for this district or one of similar soil and climate. Should I describe the best methods for Mount Gambier and parts of Victoria, where the soil and climate are so suited for onion-growing over large areas with less expense than here, I am afraid that many would be misled. Onions can be profitably grown in this locality, and harvested at a time when the markets are bare of a good export variety, if sufficient care is taken to select patches of soil that are suitable for raising heavy crops of good quality. With a fair summer, onions from this neighborhood can be harvested in February or before the bulk of the Gambiers and Victorians are ready. The soil most suited for this plant is a loose, deep, dark-colored loam, which must be fairly well drained. Onions will grow almost anywhere in this district; but if top prices are desired they must be of quality. The results of onion-culture on unsuitable land are too well known and far too risky to be recommended. If possible, select a patch of land that is open, giving all trees, hedges, &c., a fairly wide berth; and should it be at the foot of a hill, see that it is kept well drained in the winter; and also note that the ground must be kept free from weeds. Give the land a good dressing of yard manure at the end of the summer, or as soon as the former crop, whatever it may be, is taken off. After the early rain, plough as deeply as possible, then harrow it well. If very lumpy, put a soil grinder or roller over it; it can then be left until planting time, when, to improve the crop, an application of bone-super, at the rate of from 3cwt. to 5cwt. per acre should be applied. Onions have grown well on the same land several years following with the aid of manures; but a change of crop is necessary to obtain the best results. I would recommend late garden peas or potatoes for a change. There are many varieties of onions to choose from. I have found the Brown Globe most suitable here, as it comes to maturity between the early sorts, which will not keep long, and the late kinds that are rather delicate for our climate. Select the best bulbs from the last crop, or the best that can be purchased, true to name. If they are cross-bred, make sure that it has not been with an early sort, or a great deal of trouble will be experienced at harvest time. About June, plant these bulbs in rows, leaving a space of about 3ft. between every two rows, there will then be little trouble in gathering the seed heads. Promptness is required in gathering the seed when ready, as if left to get over-ripe much may be lost in handling. The heads should be cut off when about one-half of the seed is showing, and placed into large calico bags, so that it may be spread out thinly in the sun. When dry thresh it out and put it through the winnow. Take note that the onion seed loses its vitality very quickly, and should not be sown after two years old. After ploughing or digging a piece of loose dark soil, burn leaves and bark of trees on top of same, so that the ashes can be raked in before sowing the seed. This burning will force the growth of the plants, and will also help to prevent weeds from growing. Sow the seed in April in drills about an inch deep. If water is laid on, set the sprinklers going, and the young plants will show up in about three weeks. However, there will usually be sufficient rain to start the seed. Keep the seedbed well hoed, and by about the month of September, or when the plants are about 6in. high, transplant them in rows 7in. apart, putting the plants 4in. apart. Three rows may be set on two plough furrows 10½in. wide. When the planting is done after the plough, a line will not

be required, and much of the stooping will be obviated by walking along the open furrow whilst planting. Do not pull the plants when wet. Trim their tops and roots a little so that they may be the easier handled. The former leaves usually die off; but after a shower of rain they will take fresh root, and the hoe will need to be kept going to keep down weeds and the top soil loose. Some growers do not practise transplanting, and prefer to either drill in the seed or sow it broadcast at the end of winter, and when the plants are about 3in. high, thin out for a crop. The former plan, although the work of planting takes much time, is the surer and better one in this district. A good crop of onions should not be made up with a lot of 'stiff necks.' Good seed, with thorough cultivation on suitable land, will produce even-sized, solid bulbs. When the tops have fallen over they should be pulled and placed in rows, taking care to cover the bulbs with the tops to prevent the sun from scorching them. When dry, the tops and roots may be pulled or cut off, and the onions graded and bagged ready for market. The gunnybag has been used in the past, but the present-sized cornsack now in use is suitable. Use only new bags for export, and brand the bags well. In dry seasons the crop may be doubled by irrigation, the use of sprinklers being the best method. Diseases of this plant here are almost unknown; and, unlike potatoes, the onion is not hurt by the severe frosts. The chief trouble is with the lucerne flea, which attacks the young plants in the seedbed. A remedy for this is a spray of strong tobacco-water. Slugs also decrease the crop in wet seasons. Dusting with lime is recommended; but the hoe will help to eradicate the pest. Onion-growers, who do not make big profits, will not be able to say they have had no work. In conclusion, I would like to say it is necessary for producers to co-operate more in disposing of their goods, not with the idea of skinning the consumer, or even the middle man, but to find other markets that are wanting. Although Australia has been abundantly supplied with onions at times, on other occasions it has been necessary to import from New Zealand, Italy, and South America; therefore, when our markets are overstocked we should try South Africa and other countries." A number of questions were replied to by the paper-writer. The difficulty with broadcasting the seed was that if it were sown early it was liable to rot, and if it were sown later the crop would be ready for market when the outputs of Mount Gambier and Victoria were selling. Bone super. was a better manure for onions than bone dust. The most likely cause of the crop running to seed was too early planting, the seed being put in too deep, together with unfavorable climatic conditions. The cost of putting in and taking off the crop was approximately £25 to £30 per acre, and with favorable circumstances a yield of from 10 tons to 20 tons per acre should be secured. There should be no difficulty in keeping onions for one month. The practice of cutting the tops off was better than rubbing; but care should be taken that the cut was not made too close to the bulb, as the top kept it from bruising.

Narrung, June 29.

PRESENT.—Messrs. Thacker (chair), Hackett, Goode, Critchley, L. C. and L. H. Mann, J. W. and S. McNicol, Sullivan, Bolger, S. E. Morgan (Hon. Sec.), and two visitors.

SAND IN HORSES.—Mr. Bottrill initiated a discussion on this subject by reading several extracts dealing with treatment of horses suffering from sand. Mr. Hackett believed that some of the drastic measures taken were worse than the complaint itself. In some cases where oil was given it settled on the sand in the stomach and formed a hard layer, and no feed or medicine given the animal had any effect. Mr. J. W. McNicol had cured one of his animals by giving it a strong dose of coffee made with milk with a little carbonate of soda added, and then rolling the horse. Members generally thought that the best cure was to place the animal on its back and gently work the stomach. Mr. Bottrill drew attention to the inhuman treatment some stockowners meted out to their worn-out horses. He contended that when a horse became too old to work in the team it was better to shoot it than to sell it. However, horseowners should make provision for the declining years of their horses.

Port Elliot.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. H. B. Welch (chair), J. Brown, J. Barton, J. F. Vince, H. Green, W. E. Hargreaves (Hon. Sec.).

BUSH FIRES.—It was decided that the Port Elliot and Encounter Bay District Councils should be approached with the request that special constables should be appointed for

the purpose of seeing that the provisions of the Bush Fires Act were carried out. It was thought that, if convictions were secured for negligence in lighting fires, this would go a considerable way toward minimising the number of bush fires experienced in the district.

GYPSUM AND LIME.—Members were of the opinion that it would pay to make applications of gypsum and lime to orchard lands as, in addition to the manurial value, they would assist in keeping the soil open.

Port Elliot, July 20.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. H. B. Welch (chair), J. McLeod, J. Brown, J. F. Vince, H. Green, H. Welch, W. E. Hargreaves (Hon. Sec.), and Mr. W. Eastwood, of Northfield Branch.

SALT AND GUANO AS MANURE.—A discussion on this subject was initiated by Mr. McLeod, who had used 1cwt. of salt and 1cwt. of guano to the acre. Where these two had been put on together he had been greatly troubled with sorrel, and for three years the sorrel was thicker than the crop. Where, however, he had only used guano he had secured a good crop of wheat and oats. Mr. Vince made a practice of using salt for vegetable growing. He had spread it with a shovel, and the results had been good. Mr. J. Brown had used about 5cwts. of gypsum to the acre and had secured good crops of mangolds from the salt patches. Mr. H. B. Welch had spread farmyard manure and straw litter where there were salt patches, and in wet seasons good crops of wheat and oats were secured. It was pointed out that Mr. Grasby, of Balhannah, had used lime as a dressing for land on which to grow peas, with the result that the crop on the lime land was four or five times as heavy as the crop on the plot where 2cwts. of bone super. per acre had been applied.

DRY BIBLE AND SAND.—Mr. W. Eastwood reported that he had used 12 packets of Epsom salts together with a little carbonate of soda as a remedy for dry bible, with good results. For sand in horses the Hon. Secretary had used 1lb. of honey mixed with half a bottle of yeast, and the results were satisfactory. He tabled 36 small bones, of from 1in. to 5in. in length, which he had taken from the first stomach of a cow that had died after being bad for about 36 hours.

PHALARIS COMMUTATA.—The Hon. Secretary tabled a sheaf of this grass, being nearly 6ft. in height. This was the third cut during the year, and it had been grown in stringybark country. Stock were very fond of it, and when chaffed it made excellent fodder for horses and cows.

Strathalbyn, June 28.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. T. Collett (chair), P. Cockburn, J. Springbett, W. Watt, J. R. Rankine (Hon. Sec.).

Cows.—An interesting discussion took place as to the profitableness of keeping cows. Mr. Watt strongly contended that a good return was secured from these animals, but attention was drawn to the allowance that had to be made for feed, which considerably decreased the profit.

PEAS.—The relative advantages of harvesting and feeding off peas was discussed. Mr. Watt thought it advisable to turn pigs on to the crop, as it would cost 2s. per bushel to harvest, whereas, when the pigs were fed on the peas a handsome profit would be realised. A consignment of 20 pigs that he had sold as fats had been fed on nothing but peas, from the stack in the winter and in the field in the summer, when the crop was ripe. The want of a pea-thresher that could handle 200 or more bags daily was greatly felt. A suitable machine would considerably decrease the cost of harvesting.

Uraidla and Summertown, July 1.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. E. Hart (chair), W. H. Curtis, S. and E. Hawke, J. Rowe, A. Moulds, W. Kessell, H. F. Johnson, T. H. Collins, W. Squires, H. Shueard, G. Prentice (Hon. Sec.), and one visitor.

APPLE-GROWING.—The following paper was read by Mr. E. Hawke :—"In starting an orchard it is necessary to prepare the land well. All land on which apples are to be planted should be broken to a depth of at least 18in., either by subsoiling with the plough or grubbing. This gives the roots of the trees a chance to strike well down. Nearly all our land in these hills would grow excellent apples if so treated. The next point necessary is to make a good selection of varieties. To be successful you must find out which sorts are suited to the particular class of soil. Different varieties very often require different soil. Some do well in low ground. The Jonathan, for instance, should be planted in good land where it is not too dry, otherwise the fruit will be small. If the London Pippin is planted too low it will not develop into that good yellow color which is so necessary for the sale of this variety. About the best kinds to plant are—Early, Williams' Favorite, Early and Late Astrachan, Quarrenden (on a small scale) and Gravenstein; mid-season, Emperor Alexander, Worcester Pearmain, American Mother, Maiden's Blush, Jonathan; late, Rome Beauty, London Pippin, Cleopatra (which if you are prepared to supply with plenty of Bordeaux mixture is best of all) and perhaps Rokewood, though I cannot recommend it unless for its great keeping qualities. I am convinced that we cannot grow good apples without pruning them severely. I find it best to take the tops right off and thin them well, keeping the centre well open. Keep them under by cultivating all the young wood from the top right back. By so doing you will cause the tree to spur lower down. A low tree is better than a high one, as it is much easier to spray, and gathering the crop is much more easily carried out. The most important spraying to my mind is the first one in the spring. On this very often hangs the success or failure of the season. Spray with Bordeaux mixture as soon as the bloom begins to show; get the spray on the stem of the apple. The fusiladium starts on the stem first and works up to the fruit: by putting the spray on early it will prevent this. As soon as the apple has set, spray with arsenate of lead. Through the season give about three sprayings and the codlin moth will not be troublesome. I had a large Stone Pippin tree which did not bear for years. Last year I grubbed it back to a depth of fully 18in. and pulled off a lot of blighted lumps of roots, and pruned hard. The result was a crop of 9bush. of first class apples. When planting young trees too many of the same variety should not be put together, but sorts which bloom at about the same time should be close to one another on account of the advantages secured from cross-fertilization." In discussing the subject, Mr. H. Shucard expressed the opinion that Cleopatra and Stone Pippin were the best varieties to grow, provided they were well pruned and sprayed. Mr. Squires would plant young trees in well-cultivated soil, but not too deeply, and would spray them with Bordeaux mixture mixed in the proportion of one to eight. Mr. Kessell favored Stone Pippin for cooking purposes, and Mr. Moulds believed that in the majority of cases apples for export were picked and packed before they were ready. Gravenstein was a good export variety.

SOUTH-EAST DISTRICT.

Kybybolite, July 20.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), Duffield, Schinkel, Koth, Lacey, Smith, Alcock, Colebatch, A. R. Scholz, C. H. Scholz, D. G. Scott (Hon. Sec.).

CARE AND FEEDING OF HORSES.—In a short paper under this heading Mr. Duffield said that when ploughing was commenced care should be taken not to work the horses for too long a period without a spell. This would go a long way toward obviating sore shoulders. When ploughing, it was bad policy to rush the team. The best ration was made up of wheaten and oaten hay mixed, with an allowance of long hay given at night. The latter should not be given in sheaves, as this resulted in a considerable waste. Rugging should be always carried out, whether the horses were stabled at night or not. The writer of the paper had made a practice of rugging his horses for the last eight years, and he was a firm believer in it. When turning horses out, however, it was not advisable to leave the rugs on them as when rolling they would tear them.

Millicent, July 20.

(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. H. F. L. Holzgrebe (chair). J. Bowering, G. Searle, W. Downs, and H. Day (Hon. Sec.).

MELILOTUS.—A discussion took place on the value of melilotus as a food for stock. Mr. Holzgrebe said this plant was highly valued in the Wimmera district of Victoria. Mr. Searle remarked that it had become a nuisance to him, but members generally agreed that it was a useful fodder.

DRILLING.—Mention was made of the slovenly methods of drilling which, unfortunately, were noticeable in some paddocks. Late ploughing and a rough harrowing was not good farming, and when the drill was run in a wavy fashion, or perhaps in a half circle over the weedy land, the result was an eyesore to the practical farmer and a loss to the owner.

Mount Gambier, July 13.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. A. J. Wedd J. Botterill, J. C. Ruwoldt. E. F. Schlegel, C. T. Major, H. Kennedy, G. Keegan, R. Smith, H. Wheeler, H. Pick, A. Sassanowsky, H. Buck, J. A. Engelbrecht, P. Pritchard, F. Holloway, G. F. Holloway, and D. Collins (Hon. Sec.).

BERSEEM.—The following report on this clover was supplied by Mr. Engelbrecht :—
“ Following the directions of Professor Perkins, I planted 30lbs. of seed to the acre immediately on its arrival from Adelaide, which was late in March. The land selected was rich volcanic soil, and what I considered the best on the farm. A crop of early potatoes had just been lifted from it. After ploughing to a depth of 5in. it was harrowed down to a fine tilth. Owing to the fineness of the seed, considerable difficulty was experienced in regulating the broadcasting machine, with the result that the ground had to be covered three times to distribute the seed evenly. It was then rolled with a light field roller. An acre and a half adjoining was drilled with a mixture of rye and Cape barley at the rate of 3bush. to the acre. Heavy rain fell early in April, and the berseem germinated well ; but from that out it had a very unhealthy appearance. As time went on the growth was slow, and when about an inch high it looked very delicate and had a slight tinge of red on the upper leaves. At this stage a number of self-sown potatoes made their appearance and grew to the height of about 6in., when they were attacked by a heavy frost, which cut them down completely and killed them outright. The berseem did not seem to be affected ; at any rate no change was noticeable. Cape weed, however, now appeared, and very soon challenged the berseem, which now seemed to shoot up with thin, lanky stems. The Cape weed soon had possession, and at the time of writing (July) was a foot high in places. In the meantime the rye and barley had made splendid progress. Mowing was begun early in June, and since then 20 milch cows and two horses have been fed with as much as they could eat from it, and there is still sufficient to last another fortnight. If the berseem were acclimatised and planted earlier in the year the result might have been different ; but I question whether under any conditions it would grow half as much fodder as the mixture above referred to.”

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T. PASCOE,

Minister of Agriculture

POINTS FOR PRODUCERS.

Agricultural Bureau Conference at Meadows.

The Annual Conference of Hills Branches of the Agricultural Bureau is to be held at Meadows South on Monday, October 21st, commencing at 10-30 a.m. The arrangements are in the hands of the local Branch, and the agenda paper will include some practical addresses by agriculturists and horticulturists in relation to the producing industries of the district. All interested are invited to attend.

Horse Improvement in Britain.

Replying to some remarks in the House of Commons on the Government's work of horse improvement, Mr. Runciman, President of the British Board of Agriculture, said that the board had in view not only the breeding, but the retention in the country, of the best kind of light horses for sporting, agricultural, and military purposes. The amount of money spent by the board this year on premiums and super-premiums for stallions was larger than ever before. He regarded the purchase of stallions by the board as only an alternative to be resorted to if the premium system failed. Last year the board spent £8,700 on premiums and on the amount paid by the board for service fees. That enabled something like 50 stallions to be used throughout the season. Among other things, the board was also helping the cause of light horse-breeding by assisting country committees to purchase some 200 half-bred mares of substance. Last year only 312 stallions were registered by the board, but by May 31st last over 700 were registered as sound and fit, and they were travelling the road.

Californian Fruit Production.

Particulars of the 1909 census relating to the production of fruits and nuts in the United States which have recently been published show conclusively the ever-increasing pre-eminence of California. The total value of the crops mentioned in the State for the year 1909 was over £10,000,000. Of the nut crop which, in the United States, amounted to £459,400, California produced approximately £449,350 worth of English walnuts alone. Of semi-tropical fruits, including oranges, lemons, olives, figs, and pomeloes, California produced a crop valued at £3,350,000.

Health and the Farm.

The following passage is taken from a paper on "Farm Life Inducements for Young Men," read at a meeting of the Kansas State Board of Agriculture : — "Health is a heritage of the farm. It is the embodiment of energy, stamina, initiative, and virility. In large cities laborers who thrive by right of muscle alone are employed largely in the grinding work of mechanics, where they must toil under more or less unwholesome conditions, which tend to rapidly deplete their physical strength, and sooner or later leaves them without position and with little left for their declining years. The city man, intellectually occupied, too frequently becomes pale, nervous, and worn in the fetid atmosphere of confinement. The city is a marsh light. It lures with glitter and gaiety, its theatres and clubs, its kaleidoscopic activities ; but eventually the dweller of the city pays dearly for the privilege of congestion and contamination. It is when the experienced eye, looking below the surface of things, views the tragedies of the city, that he longs for that indefinable, soothing, and consoling something which we term Nature, and yearns for that bodily fitness which is found at its best in the open life and pure air of the country. Yes, health is one of the strongest inducements the farm offers ; and this is true now more than at any time in the past, because in addition to natural favorable environments, the farmer of to-day is guided more by scientific methods of living, systematically and conscientiously executed, which operate as surely as cause and effect for his physical betterment."

Bitter Pit.

Professor D. McAlpine has presented to the Federal Government his first progress report on the subject of bitter pit. No conclusions have been drawn, as the inquiry so far has been in the nature of clearing the way for definite investigation later. A lot of laborious initial work has been done, and it is evident that Mr. McAlpine is dealing with this intricate subject in a practical and scientific manner. The apples which, as regards their susceptibility to bitter pit, are classified by Mr. McAlpine as "very bad to bad," are Anne Elizabeth, Buncombe, Cleopatra, Cox's Orange, Lord Wolseley, Magg's Seedling, Northern Spy, Prince Bismarck, Ribston Pippin, and Shockley. The "medium" are Delicious, Duchess of Oldenberg, Esopus Spitzenberg, Hoover, Nickajack, Shepherd's Perfection, Prince Alfred, Rokewood, Sturmer. The "slight to very slight" are Ben Davis, Dumelow's Seedling, Five Crown, Gravenstein, Jonathan, Murroe's Favorite, Pomme de Nieve, Reinnette du Canada, Rome Beauty, Rymer, Scarlet Nonpareil, Statesman, Stone Pippin, and Winter Majetin. Mr. McAlpine has been successful in obtaining many excellent photographs, which show the effects of bitter pit in its various forms. —*The Fruit World.*

Agriculture in Great Britain.

A report from the Board of Agriculture on the total output of agricultural land in Great Britain, in connection with the Census of Production Act of 1906, has been published. The figures relate to the year 1908. In summarising the figures it is explained that the "total output" is represented by the value of the products sold off farms, partly in crops as grown, and partly in animals and their products. Thus, the total value of the farm crops of Great Britain in 1908, at market prices, is put at £125,000,000, of which the sum of £46,600,000 represents the portion actually sold; the remainder, except for a comparatively small proportion consumed by farmers' households, went to feed the stock and to maintain the fertility of the land. The chief headings are those of farm crops actually sold, £46,600,000; fruit, flowers, and timber, £5,200,000; animals, £61,400,000; wool, £2,600,000; dairy produce, £30,000,000; poultry, £5,000,000; total, £150,800,000. Reckoned on the 47,795,323 acres covered by the total value of the produce, the output amounts to about £3 3s. 1d. per acre; but the range is very wide, that of woods, for example, being only about 6s. per acre, and that of 13,000,000 acres of rough grazings only 10s. to 12s. per acre. On the 32,000,000 acres of "cultivated land," of which nearly 17,500,000 acres are in grass, the grass output is estimated to average nearly £4 10s. per acre. Attention is drawn to the fact that the returns on which the estimates are based do not cover holdings of less than one acre, and that, therefore, they cannot be regarded as complete, especially in connection with pigs, poultry, and minor crops, while the great but unknown amount of produce grown under glass is not included. Further, it is remarked that the agricultural produce of a single year is not to be taken as an average. In addition, it may be pointed out that, although the schedules of inquiry were sent to all occupiers of an acre of land or more, the returns for certain classes of produce were only 28 per cent. to 37 per cent., upon which proportions estimates for the whole were based. The estimates for the principal crops, however, were based on the ordinary agricultural statistics and the official price averages.

Development of Irrigation in the United States.

According to the last national census, the total acreage under irrigation in the arid and semi-arid States is given as 13,739,499 acres. This is an increase of 82.5 per cent. in the last decade, and 278.3 per cent. in the last two decades. The total area of irrigable land in the United States included in present projects and yet to be irrigated, comprises 31,112,110 acres. This vast area does not contain the total irrigable land; it is probably about half of what will ultimately be irrigated in the arid region. Professor Potrier, an authority on irrigation matters, estimates that the area susceptible

of successful irrigation is about 50,000,000 acres of land in the arid region, this area being all that the visible water supply in the territory designated will cover to advantage. When the ultimate development in irrigation in the West is reached, say in about 20 years, the irrigated section will support a population several times greater than at present, and land values will be proportionately higher. The extension of irrigation will result in a better conservation of our water supply, also in a more economical and effective use of irrigation water than is now practised. As land values increase, improved methods of irrigation will be adopted, and water will be made to perform a much greater duty than at present.—*The Irrigation Age*.

Farmers and the House of Commons.

Writing to an English farmers' club recently, Mr. Jesse Collings, M.P., asserted that in the House of Commons, while there are a number of bankers, lawyers, railway directors, shipowners, and other commercial men, there are only three farmers. The President of the Board of Agriculture is a shipowner, and the only farmer in the Government is a Lord of the Admiralty. He urged the farmers to unite to alter this state of things.

To Clean Testing Glassware.

In testing milk it is important that the pipettes and testing flasks should be kept as clean as possible. Unless the flasks are immediately emptied and thoroughly washed after testing, a film or coating of fat adheres to the inside of the glass which may appreciably increase future readings. In emptying the flasks after completing the tests; shake them up and down in order to remove the calcium sulphate deposited on the bottom of the flask during testing. Then add to each flask about 15 c.c. of the following mixture:—1oz. of potassium bichromate dissolved in 1 pint of sulph. acid. Shake well, empty this mixture and use a test flask brush and run it up and down the neck of the flask. Have the flasks in soapy water, and finally rinse in warm water, and allow the glassware to drain.

Irrigation by Sprinkling.

Irrigation by sprinkling (says the *Irrigation Age*) is being tried in California, and is meeting with favor, the only drawback being the cost of installation. It is said that by turning on the spray during a cold night the air can be kept above the freezing point.

Farmwomen's Clubs.

A movement which has made great progress in the United States is the formation of farmwomen's clubs in the country districts. These have assumed various forms, but their efforts are specially directed to three principal objects, viz., (a) the artificial creation among the women of rural districts of those social relations which, whether owing to recent immigration or to the long distances between the farmhouses, could not otherwise arise among them; (b) the variation of the monotony of domestic occupations by some kind of recreation, the want of which leads many country women to prefer city life; (c) the enrichment of the minds of the women by a reciprocal exchange of useful information and knowledge.

New York Farmers' Institutes.

The record of New York farmers' institutes during the season of 1911 and 1912 shows that 358 meetings were held throughout the State. The total number of sessions was 1,261. Altogether more than 131,000 people attended these meetings. In addition to the regular institutes and institute schools, of which latter seven were distributed at widely separated points in the State, the institute lecturers addressed 12,600 pupils in the rural districts. They also assisted at conferences of teachers in charge of representatives of the State Educational Department. At these sessions more than 5,300 teachers were present. Approximately 180 lecturers addressed the various meetings, and every phrase of New York State agriculture was covered. Under the direction of the Commissioner of Agriculture, the farmers' institute work is being supplemented by the visits of experts to farms where special problems arise and where farmers desire the advice of experienced agriculturists.

South Australian Grown Tobacco.

For the past 10 or 12 years Mr. J. Selth has been experimenting in the growing of tobacco in the grounds attached to his residence at New Parkside. Up to the present Mr. Selth has confined his attention to cigar varieties, and he claims that he has now passed the experimental stage, and has demonstrated that with proper treatment plants producing good saleable tobacco can be successfully grown in the locality mentioned. Next year Mr. Selth intends to experiment with the growing of pipe tobacco, a number of varieties of which have been forwarded to him by Mr. G. Ware, who obtained them from the experimental station in Ireland. Recently the Secretary of the Advisory Board of Agriculture (Mr. G. G. Nicholls) forwarded to the Director of Agriculture in Victoria for testing and analysis two leaves of Sumatra

tobacco which had been grown by Mr. J. Jarvis, of Walkerville, the plants having been supplied by Mr. Selth. Subsequently Mr. Nicholls stated that the samples had been thoroughly examined by the Victorian Tobacco Expert, who had reported as follows :—" The two leaves forwarded are a really nice sample of cigar leaf, being fine in texture, of a good color, and with not too heavy a vein and rib. The tobacco has not been properly fermented, and until this process is completed it is not likely to make a good smoking article with a nice flavor. I have, however, tested it, and found that it smokes fairly well, and burns a better ash than could be expected in the circumstances. I am convinced that if this tobacco were properly treated it would make a very saleable article, being suited for bunch, wrapper, or filler purposes. From the size of the leaf I would estimate a crop of about 600lbs. to 700lbs. weight of cured tobacco to the acre. If the sample forwarded is indicative of the whole crop its market value would be, say, from 10d. to 1s. a pound." It should be explained that the leaves were merely dried, placed between strips of cardboard, and forwarded in that state to Victoria. No attempt was made to ferment them in the ordinary way.

Irrigation in California.

During the last 10 years the number of irrigated farms in California has increased from 35,675 to 39,352, while the acreage irrigated has increased during the same period from 1,446,114 to 2,664,104. The length of all irrigation ditches in the State is 21,129 miles, which have been built at a cost of \$72,445,669.

Production of Grapes in United States.

The last census shows that in 1909 there were produced in the United States 2,570,936,310lbs. of grapes, having a total value of \$22,025,060. The production at that time was almost double what it was 10 years previously, when a crop of 1,300,751,066lbs. was gathered. The returns of the 1900 census secured no information as to the value of the grapes.



INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

CATERPILLARS BORING INTO PEACH TREES.

The Waikerie Branch of the Agricultural Bureau forwarded a number of grubs which were found under large lumps of gum on peach trees. Information regarding their life history and means of eradication was asked for.

Answer—These are the larvæ of a moth which lays its eggs upon the trees, more particularly where any gum is oozing out, and principally in the forks of the branches, or upon the trunk. Such places should be examined at pruning time, and any sawdust-like borings will indicate the presence of the insects. This evidence should be followed up by scraping away the gum and borings, and if the caterpillars have tunnelled into the wood and are out of sight, the holes will be seen. Sometimes a piece of thin wire may be pushed into the hole and the borer killed. If the tunnel is crooked, a small quantity of cotton waste saturated with carbon bisulphide or benzine may be thrust into the hole, which should be immediately plugged with clay. This will suffocate the borers. If much of a wound is made by the insects, paint it with Stockholm tar or any carbolic preparation.

WASHINGTON WHITEWASH.

"A. B." asks how to prepare Washington whitewash.

Answer—Slake a bushel of quicklime in a barrel, covering with a bag while the lime is working; melt 1lb. common glue to a thin size; make 1½lbs. ground rice into a thin paste with boiling water; mix up 1lb. whiting as you would mustard. When the lime is quite slaked, add the glue, whiting, and rice paste, and a half-peck of common salt. Mix well and let stand for 48 hours, keeping covered. Thin down to consistency of ordinary whitewash and apply hot. The White House at Washington is said to be coated with this preparation. If properly made it will neither wash nor rub off, and has all the appearance of paint.

RUSSIAN SUNFLOWERS.

"J. E. H.," Forest Range, is desirous, as an experiment, of growing sunflowers with a view to using the seeds as feed for poultry, and asks for information as to the class of seed, time for planting, &c.

Answer—The sunflower used for the purpose of feeding seeds to poultry is the large Russian type of annual sunflower (*Helianthus annuus*). It is sown at the rate of about 6lbs. per acre, and costs locally, from E. & W. Hackett, 6d. to 1s. per pound. The soil should be worked down to a fine tilth, and the seeds sown either broadcast or in shallow drills, which are from 2ft. to 2ft. 6in. apart, and the seeds dropped in about 6in. to 9in. apart. A sprinkling of superphosphate on the drills, but not on the seeds, will help. Cover the seeds about twice their own length with loose soil. They should be sown when the frosts in the neighborhood are over.

UNPRODUCTIVE POULTRY.

"J. W. H.," Mikkira, has 31 fowls; he feeds them well, but they have not laid an egg for several months. He asks for advice, and also at what age turkeys and geese should be mated.

Answer—(1) You are probably overfeeding your fowls, as you say they are very fat. There is an old proverb, "Fat hens are ill layers." As regards the Indian Games and Malays, these are notoriously bad layers, and if the crossbreds have Malay or Indian blood in them they will likewise prove poor layers. Can you get any meat for them—rabbits or plucks? If so, boil a pluck or a rabbit and then chop up and mix with a little bran, and give the birds a hot feed in the morning and use less grain. This should have the desired effect. (2) It is not advisable to breed from either geese or turkeys until they are two years old. They will certainly breed, but the progeny are inferior, and if again bred from, the stock will deteriorate in every way.

BINDER TWINE CUT WITH HAY.

"A. S. P.," Maitland, desires to know whether binder twine, i.e., the bands of the sheaves, cut with the hay and fed to horses is likely to be followed by any injurious effects.

Answer—Yes; it is likely to assist in the formation of dung balls (*calculi*) in the bowels, and cause colic.

LUCERNE AND LUCERNE FLEA.

"H. E. B.," Echunga, writes—"Can you inform me if there is any known treatment which will make it possible to get a crop of lucerne where the lucerne flea attacks the plant on its first appearance above the ground. The soil here is suitable for lucerne, being a black alluvial flat, but the flea is very prevalent in the surrounding vegetation. Repeated trials have resulted in the pest cleaning all but a few plants out. These few have always done

well. What is the most suitable variety of lucerne for a cold district? Water is at about 9ft. or 10ft. from the surface. What is the most suitable manure for lucerne? What is the most suitable manure for maize for green fodder?"

Answer—The best method of preventing the ravages of this pest on new lucerne ground, is, in the first place, to have the land thoroughly cleared of weeds before planting, and afterwards to work up from a chain to a chain and a half of land around the whole of the lucerne plot. This must be kept in a thorough state of cultivation and free of weeds; the object is to do away with any possible harbor for the pests, while at the same time the strip of cultivated land offers them no inducement for further exploration in that direction. Another method found to be fairly effective is to keep all weeds and grass surrounding the lucerne plots grazed closely with sheep. The most suitable variety of lucerne for a cold district is South Australian, or guaranteed Hunter River, or Tamworth seed. Some of the other varieties might possibly give better results under extreme cold conditions, but up to the present no special tests have been made in that direction. The manure required for the lucerne depends entirely upon the quality and nature of the soil. The safest dressing to recommend, without further information on the subject, would be a liberal dressing, say, 3cwts. or 4cwts. of bone super. to the acre, if the soil has been impoverished to any extent by previous cropping. The same remarks apply to manure for maize. Under any conditions, stable manure will give the best results if it can be procured in sufficient quantity.

STOCK INQUIRIES.

(Replies supplied by Mr. F. E. PLACE, M.R.C.V.S., B.V.Sc., Veterinary Lecturer.)

Delayed Cleansing of Cow.

The Mount Pleasant Branch of the Agricultural Bureau desire to know the best means of dealing with cows whose afterbirth is unduly delayed.

Answer—Normally a cow should clean within 36 hours after birth, but if after the twelfth hour the membranes do not appear to be coming away properly, the following drench may be given with advantage:—Epsom salts 1lb., flowers of sulphur 2ozs., powdered ginger 1oz., to be dissolved in a quart of gruel, or warm water and molasses, to which half a pint of gin has been added; if in the next 24 hours the cow has not cleaned, the drench may be repeated. The womb should be flushed out with 2galls. of warm water in which Condry's crystals, or permanganate of potash, as much as will cover a threepenny bit, has been dissolved. The flushing may be done with the proper syringe, or failing that, equally well with a few feet of rubber gas piping and an enamel funnel. The piping is passed well into the womb and the funnel end raised well above the cow, the solution will then gravitate into the organ and well irrigate it. If this also fails to cause the removal of the membranes, the part hanging out should be secured between a split stick, round which it

can be rolled, and a gentle, steady pull kept on it, the utmost care being taken not to break it off. If this also fails, the arm should be well greased with lard and passed into the womb, at the bottom of which the membranes will be found attached by a number of button-like processes (*cotyledons*). These must be squeezed off between the first and second fingers, while a steady pull is kept on the membranes from outside. If the membranes are very rotten, owing to having been held too long, extra flushings will be required; and the operator should not have any cuts about his arm, as there is a risk of blood poisoning. If the cow remains weak she should be drenched with beer and gin for a few days.

Death of Cow.

A member of the Forster Branch of the Agricultural Bureau reports the loss of a cow. There was a considerable discharge from the nose. the animal swelled greatly at the chest, she appeared to have an abnormal appetite, and passed a considerable amount of blood with her excreta.

Answer—The statement of symptoms supplied is altogether too vague for an opinion to be given, but with the exception of the abnormal appetite it is possible that they point to malignant catarrh. The discharge of blood with the dung, however, rather points to an infestation with worms. Should other animals appear to suffer in the same way it would be well to dose them with brimstone and treacle—1oz. of flowers of sulphur to a pound of treacle or molasses every day till they have purged well, which will probably be on the fourth day.

Flies Troubling Stock.

A member of the Coorabie Branch of the Agricultural Bureau drew attention to numerous small flies which congregated around the stables, and which seemed to attack horses and cattle as soon as they came in from the paddocks. When killed, after having settled on the horse, the flies were found to be full of blood. They somewhat resembled the common house fly, but were larger, a little lighter in color, and had a long sucker. Information was sought as to the name of the flies and whether they were injurious to the horses.

Answer—In the absence of the flies it is not possible to state definitely what kind they are, but from the habits described it is probable they are a species of breeze fly (*Tabanidae*), which are very plentiful in all parts of the world. They are not bot flies (*Gastrophilus equi*), which are not blood suckers. Many of the breeze flies carry fatal diseases to animals upon their suckers, which have been inserted into an affected beast. As a preventive, the horses might be wiped over with a rag dipped in kerosine, oil of eucalyptus, or other strong-smelling oil to which the flies object. The following procedure will kill off large numbers:—Mix two tablespoonfuls of 40 per cent. formalin in a whisky bottle of water, pour equal quantities of this and milk into a saucer, and put a piece of bread into it as an island for the flies to settle

on. Put half a dozen or so of such saucers in the stable during the day. Sweep up and burn the dead flies that will be found lying about.

Catarrh and Stones in the Bladder.

A member of the Coorabie Branch of the Agricultural Bureau was experiencing trouble with an aged draught gelding. Three months ago the animal showed signs of griping pains, and drops of blood passed through the penis. It was given three doses of saltpetre, which seemed to relieve the difficulty for about three weeks, when it recurred. Further doses of saltpetre appeared to clarify the urine, but there was a continuous dripping from the penis. When turned on to green wheat the complaint became worse. The penis swelled and broke out at the end, and there was a discharge of blood and matter from it. Bran mashes and saltpetre administered during the past week seemed to have had little effect.

Answer—Old horses, such as the one in question, frequently suffer from catarrh of the bladder, with stones (*calculi*) in it and in the pipe through which the urine passes; this appears to be the trouble in this case. It would be well not to give any more saltpetre, which, although good in many cases, is likely to prove an irritant in this; instead, let him have in a bran mash, or as a drench if he will not eat, in a pint of barley water, made from pearl barley, two drams of bicarbonate of potash twice a day for five or six days; also, if drenching, a dram of powdered camphor twice a day. The organ should be washed twice daily with warm water and a good household soap, such as "Sunlight," and then dressed with olive oil, in which half an ounce of powdered camphor to one pint of oil has been dissolved. Keep the horse on soft feed, preferably green stuff, but not lucerne, and let him drink very freely. Two ounces of the camphorated oil might be injected up the pipe by means of a glass syringe with advantage.

"C. J. W.," Port Lincoln, asks—(1) In order to save handling costs and waste, can chaff be stored in bulk in a large shed, it being chaffed into same directly it is carted from the stooks and not stacked at all? (2) If the hay was chaffed directly from the paddock into an airtight silo and weighted, would the chaff be as good for horses as chaff made from stacked hay?

Reply—(1) In order to get hay sufficiently dry to be chaffed and stored in bulk without stacking it would be necessary to leave it too long in the field. Each day it is left increases the amount of weathering, and, of course, increases the risk from broken weather. Altogether, it would be an unprofitable practice and not to be recommended. (2) The proposal to chaff hay direct into an aerated silo, and press it down with weights, is not one to be advised. The chaff would grow more or less mouldy around the outside from the sweating in bulk. It would be more or less fermented, and would be dangerous to feed to horses. To chaff into the silo the stuff requires to be cut green, and only slightly wilted.

TAINTS IN MILK AND ITS PRODUCT.

THE NECESSITY FOR CLEANLINESS.

By H. J. APPS, Dairy Officer.

The susceptibility of milk to taints is at no time more strikingly manifest than in the spring and summer months of the year. The weedy flavors are more prevalent when the food is succulent and abundant, as the pasture then invariably contains a large proportion of herbage which impart gaseous taints. Thus one is inclined to attribute all taints to the class of foods which the cows receive. This is in a great measure responsible for some, yet another factor, which tends to affect the physical condition of the milk, is the invasion of filth organism, due to the lack of cleanliness and attention bestowed to the milk and cream.

Obviously, then, some of the taints or bad odors can be to an appreciable extent minimised. This is especially the case in so far as the influence of milk is concerned, when we observe how readily it becomes contaminated and also when we consider to what degree weeds exert their influence by imparting bad flavors, the milk in some instances having a pronounced weedy flavor. So long, however, as the taints exist in the milk and cream, the quality remains inferior, and the market price realised is not so great as for fine-flavored milk or its products.

It is impossible for the factory manager to manufacture really first-class cheese or butter from milk or cream which is pronouncedly tainted. In some cases, however, where rigid grading is enforced, it is within his power to prevent the bulk of the cream from becoming contaminated by the addition of such cream. In cheese-making it is harder to cope with the defect unless the manager introduces a pure starter or culture of lactic acid to overwhelm the gas-forming organism. Many dairymen have not so good a conception as they should have of the ease of contamination. The warm milk as it comes from the cow is a splendid medium for the growth of all kinds of bacteria which may gain access to it. In order to lessen this development, every precaution should be taken to guard against their invasion right from the time the cow is being milked until the cheese or butter is manufactured.

There are, of course, several influences, such as health, treatment of the cows, feed, water, cleanliness, &c., that more or less affect the character of the milk and its products. Impure water is probably one of the most potent factors; anyone allowing his cow to drink such water must be conscious of the ultimate results. The water used for washing the dairy utensils occasionally is not renewed sufficiently to guarantee the proper cleansing of the

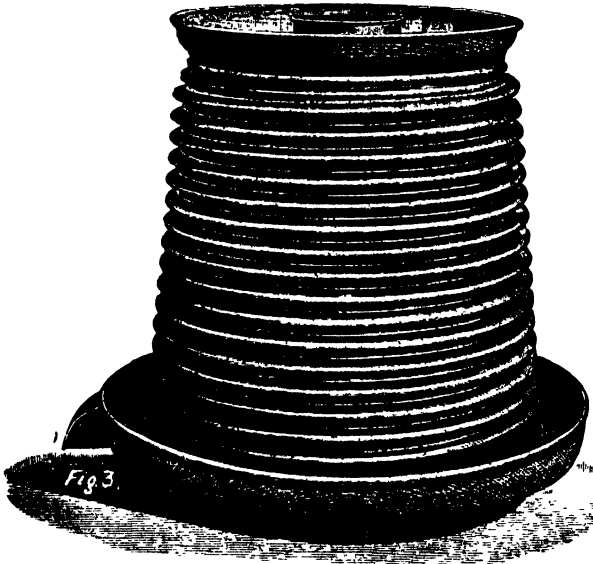
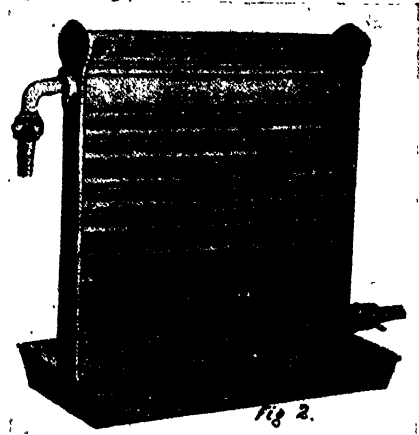
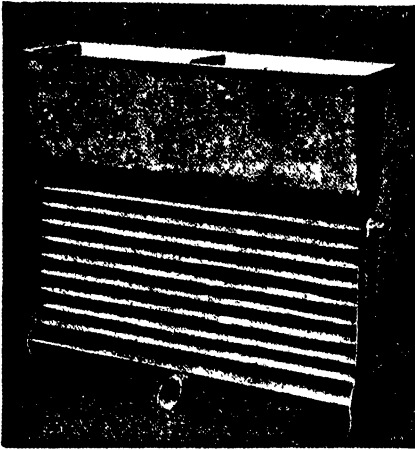
utensils. It is far too common to find that in washing the bowl of the separator it is placed immediately into the washtub together with the other appliances, instead of first being thoroughly scrubbed free of the filth or slime that adheres to the inside portion, and that one lot of water only is used for the whole washing process. Unless the farmer gives never-ceasing attention to his produce he cannot expect to attain success. The careless dairyman is gradually awaking to the advantage of this all-important fact in connection with the care and treatment of the milk and cream. It certainly behoves him to do so, especially as the majority of the factories are now paying according to the quality of the produce. This is the only legitimate method to employ, for why should the dairyman who takes no particular care of his milk or cream secure just as high a price as the man who is continually paying attention to the condition in which he delivers the product. As dairying becomes more firmly established there will be less complaints concerning the taints in the produce. Once the farmer has built up a good paying herd, he will make provision for cultivating and laying down good pastures for his stock, and will also give more attention to the treatment of his milk and cream.

CARE OF MILK.

Where a large number of cows are milked it is a good plan to allot the work of bailing up and washing the udders of the cows to one man. This lessens the possibility of introducing filth, &c., into the milk, besides greatly facilitating the work of the milkers. If the udders of the cows were in all cases either washed, or at least wiped with a damp cloth, previous to milking, it would reduce the number of bacteria in the milk by fully 80 per cent. when compared with udders that have not been so treated. The milk should be removed from the cowshed as soon as practicable after milking, so as to avoid the danger of absorption of odors. All milk should be passed through a strainer; a very fine mesh wire strainer is preferable to cloth, unless the cloth is thoroughly washed after each milking. The strainers should be occasionally cleaned during the milking. It is an accepted fact that the fine flavor and keeping quality of butter is largely dependent upon the treatment of the milk right from the time it is drawn from the cow until the cream is about to be churned.

In several cases the animal heat or odor and various taints can be greatly eliminated by cooling and aerating the milk. Should the milk be separated immediately after milking it may be merely aerated by allowing it to run over the cooler without any water circulating within the coils of the cooler; but such a procedure must be done in a sweet atmosphere. The nearer the temperature of the milk to that when it leaves the cow the better the separation; but it is imperative for good results that the cream be aerated and cooled as it is leaving the separator. Proper aeration implies two essentials—that the milk be warmer than the surrounding atmosphere, and that the air itself

be purer than the milk. Animal heat is always present in milk, and to ensure the best as regards future products it should be removed. Milk is prone to decomposition—it has a constant tendency towards acidity on exposure to the air—thus the vigilant necessity for its preservation is increased. When



Types of Milk-Coolers.

milk is intended to be kept for some time before separation it should be cooled as well as aerated to a temperature below 60° F., as this checks the action of various germs.

Under no circumstances use the milk from freshly-calved cows for at least before the tenth milking, and in some instances the time will require to be extended. Inclusion of milk from cows suffering from any affliction of the udder, inflammatory or otherwise, only tends to reduce the quality of the remainder. Unhealthy cows, rusty and foul-smelling cans, dirty separators, etc., are conducive to the greater number of taints and odors in milk.

FEEDING.

Cows fed on foods which impart a taint to milk should be fed sparingly and immediately after milking. This will to a great degree minimise the danger of such taints.

IMPORTANCE OF VENTILATION.

Milk rooms, as well as the bails, should be scrupulously clean, being kept free from bad odors of any kind and as dry as possible, as no food so easily absorbs odors as milk. The floors, walls, ceilings, &c., should be free from all impurities, and spilt milk should not be allowed to decompose. In some cases where precautions are not exercised more danger is likely to follow aeration and cooling than if no treatment was employed, as for example when the atmosphere is bad and the temperature greater than that of the cooling point, the power of absorption being greater when the atmosphere is higher in temperature than the milk.

CLEANING DAIRY UTENSILS.

Dairy utensils should first be rinsed with cold water to remove all particles of milk. Then they should be thoroughly scrubbed with a scrubbing brush in hot water containing $\frac{1}{2}$ per cent. of washing soda. After this they should be well steamed, or at least rinsed in boiling water, and finally placed away in a well-ventilated spot. It is strongly recommended that a liberal supply of limewater for washing floors, utensils, &c., be constantly used.

Washing the separator is not a very difficult operation if done soon after separating. The water for washing should be warm, but not hot enough to cook any portion of curd that may be present. Never allow the separator to be placed together unless just before using the machine. Whilst the parts are disconnected see that each part is properly separated and well exposed to the air. If not well aired a foul smell soon arises. This odor is invariably imparted to the cream whilst being separated from the milk.

If a cooler is not available, or the water is not sufficiently cold, the can containing cream should be placed in the coolest spot and the contents occasionally stirred. If the can is placed in water the lid should be removed, thus giving the animal odors a chance to escape. A clean dry cloth may be substituted for the lid as a protection from dirt, &c.

The first as well as the last requisite is cleanliness.

(To be continued.)

THE POULTRY TICK.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

[Paper read before the members of the Microscopical Society of South Australia, June 25th, 1912.]

(Continued from page 19.)

THE LIFE CYCLE OF THE TICK.

Plate 15.—Micro-photograph. Ova (eggs) in body of tick in Plate 14 x 45. This illustration shows the central and left-hand ova seen in Plate 14.

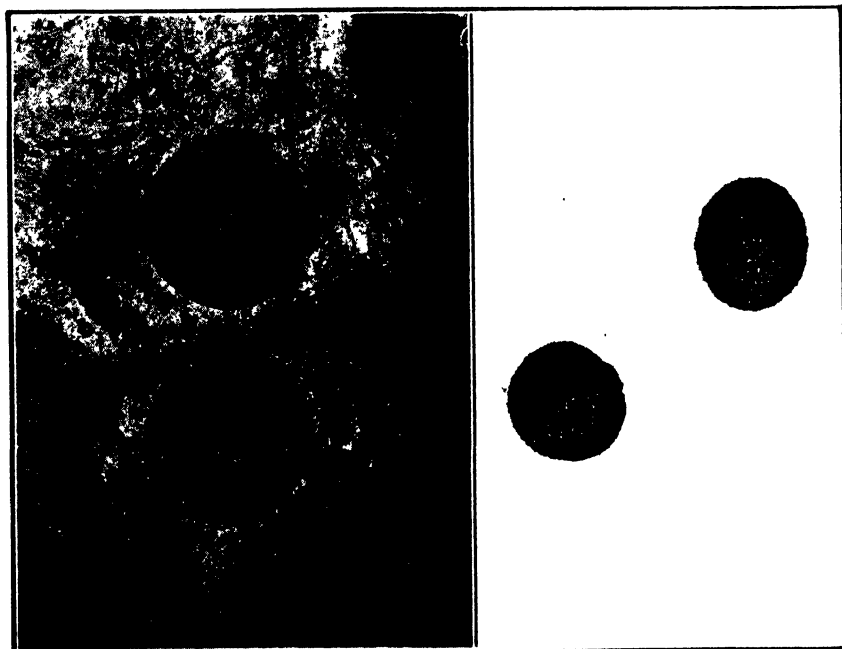


PLATE 15.

PLATE 16.

Plate 16.—Micro-photograph of ova (eggs) of tick x 45. The ovum on the right-hand shows a typical egg. The egg is about .05 m.m. long by .04 m.m. broad; in color it is a shining dark reddish-brown, enclosed in a fairly tough chitinous membrane. On examining a jar of ticks recently

collected, numerous eggs will be found; some on the bottom of the jar, others temporarily attached to the backs and legs of the ticks. Hatching occurs in due course, about three weeks, according to Lounsbury; but I think the time must be less. Nuttall says 11 to 13 days. However, one must very carefully examine all the ticks before consigning them to the specimen jar, as it frequently happens that larvæ will be found attached to the old ticks. In nature the tick lays her eggs in cracks and crevices, although I have found them on the body of the fowl on several occasions, but have not recently obtained specimens for illustration, the practice being uncommon.

I believe the tick to be occasionally viviparous, as I have on three occasions seen a female tick on the side of a glass specimen jar deposit a young tick



PLATE 17.

surrounded by a transparent jelly-like mass, from which it emerged in a few minutes. I have examined and observed carefully hundreds of specimens during the last few years, but have not witnessed a recurrence. On the last occasion there was also present a trained observer, who died some years ago. He was convinced of the fact as we saw it.

Plate 17.—Micro-photograph of eggs and young ticks x 24. The centre egg was ruptured in the process of mounting, the others show the characteristic shape. The young ticks (larvæ) are interesting, especially the right-hand

lower specimen, which shows the undigested egg yolk in the digestive cæca very distinctly. When examining a live tick, at any stage of development, and after feeding, the peristaltic action of the digestive organs is most interesting to observe.

Plate 18.—Micro-photograph of young tick (larva) x 24. This specimen is a newly-hatched tick, and is known as a larva. At this stage the young tick has three pairs of legs only, and is light-grey in color, and moves like an ordinary long-legged spider. The body is circular in form, viewed dorsally, and the mouth parts and palpi are very prominent anteriorly. The palpi and rostrum are very clearly shown in this plate. It has no spiracular nor genital orifice. The tick at this stage is very small, averaging about .75 m.m. long by .70 m.m. in breadth. At this stage the casual observer, including most poultrymen, would not notice their presence on the woodwork of the poultry houses, and if observed would be confused with ordinary unfed mites.

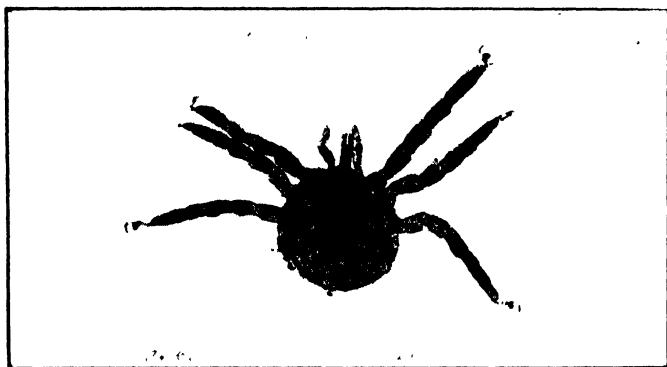


PLATE 18.

In this stage they are frequently attached to the adult ticks, and are carried to the host, the sleeping fowl. Others, and the greater number, reach their prey by the aid of their own legs and marvellous sense of smell, or something else. They move as soon as their chitinous covering has hardened. They feed for five to 10 days, and swell considerably, appearing as blue-black spots on the fowl.

Plate 19.—Micro-photograph of larva x 24. This specimen has not only fed, but his body shape is in process of alteration. The rostrum and palpi are seen closed together; the blood of the fowl is to be clearly seen in the digestive tract, and the specimen was almost gorged with blood.

Plate 20.—Micro-photograph of larva x 24. This shows a young tick from the duck's neck, *vide* Plate 10. This tick was well gorged and considerably changed in shape, as was the case with those shown on the fowl in Plate 13. This tick left the duck's neck, having evidently satisfied its appetite.

The gorged tick is of a blue-black color on the host; when preserved the specimens are often reddish in color. The gorged ticks, as has been stated, change in shape, the body becomes oval, and the characteristic markings of the adult appear. After gorging themselves, they retire to a crevice to remain dormant, digesting their meal. They then, at the end of a few weeks, shed their old skin (moult) and acquire their fourth pair of legs and the spiracles (breathing organs). They are then known as nymphs, of which there are two stages.

PLATE 19.

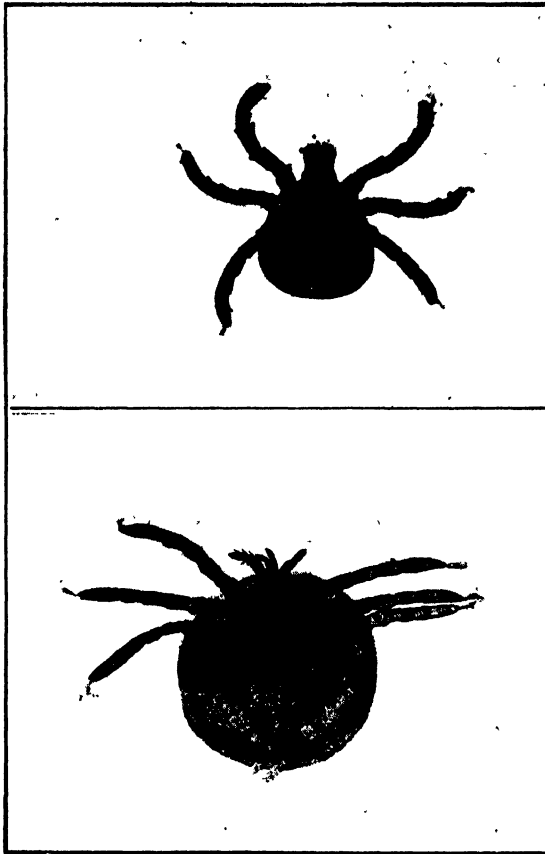


PLATE 20.

Plate 21.—Micro-photographs of mouth parts of tick in Plate 20 \times 100. This interesting plate shows an enlarged view of the mouth parts of the young gorged larva shown in Plate 20. The armed mandibles are very distinctly seen, with the saw-toothed cutters. The body outline is visible, and shows that the hood has extended and so nearly covered the capitulum that without magnification the mouth parts cannot be seen from the dorsal view.

Plate 22.—Micro-photograph of young ticks x 7. This shows the dorsal view of a nymph and a small tick. In both the digestive caeca are plainly shown, more particularly in the nymph. The demarcation in the latter is due to the presence of ingested blood.

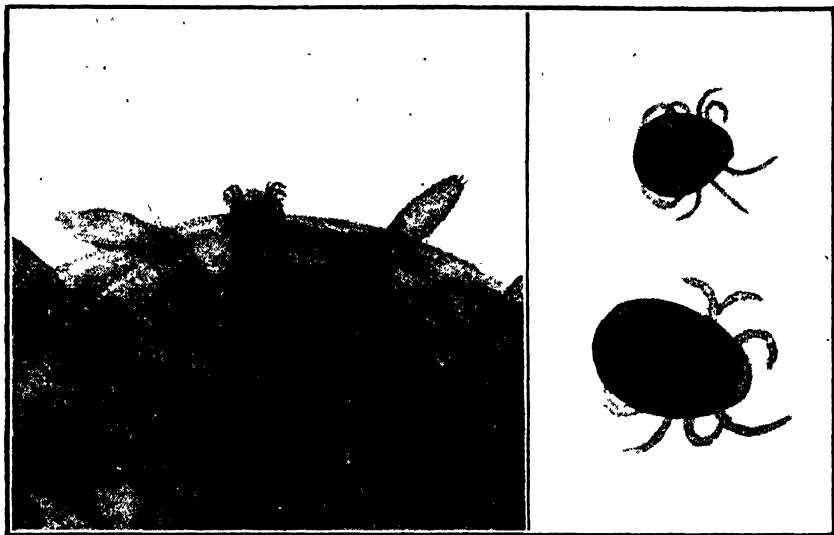


PLATE 21.

PLATE 22.



PLATE 23.

PLATE 24.

Plate 23.—Micro-photograph of young tick x 7. Here we see a dorsal view of a young tick (nymph) which, like the larger one on Plate 22, is rather more than half grown. Careful examination is necessary to distinguish

the sexes. The female is the larger and thicker of the two, but a small female and an adult male are alike in many respects. The genital orifice of the female is longer than that of the male.

Plate 24.—Micro-photograph of mouth parts x 24. This shows an enlarged view of the mouth parts of an adult female tick. Immediately posterior to the capitulum, or base of the mouth parts, the genital orifice can clearly be seen. This slide is one of Mr. Poole's, and gives most interesting details of the palpi, mandibles, and also of the integument of the underside of the tick.

Plate 25.—Micro-photograph x 7. This shows the ventral aspect of a medium-sized tick (nymph). The mouth parts are clearly shown, and the detail is distinct. They are two stages of the nymph. Nymphs feed rapidly



PLATE 25.

PLATE 26.

one and a half to two hours. After a feed they moult. In a few weeks they feed again, then moult and emerge as the adult.

Plate 26.—Micro-photograph of mouth parts of medium-sized tick x 45. This plate shows the dorsal view of the mouth parts of a medium-sized tick. The integument forming the hood has been reflexed, thus exposing to view the upper surfaces of the mandibles and palpi. The detail shows the bulbous muscular attachment of the mandibles.

Plate 27.—Micro-photograph x 8. This is the ventral aspect of a fully-matured tick. Not until full maturity do the genital orifices appear. The genital orifice is situated just behind the mouth parts and, as stated, the male by inserting his rostrum transfers the spermatophores into the female orifice. In a sunny room where jars of tick are kept this peculiar act may often be

observed. The genital orifice is seen at "A." Asymmetrical (uneven sided) specimens are frequently met with. This specimen appears to belong to that class.

Plate 28.—Micro-photograph of spiracle x 200. This highly interesting plate gives a splendid picture of a spiracle, one of the breathing tracheæ, of the tick. In the larval stage the tick has no spiracles, they appear after the first moult and with the fourth pair of legs (in the nymph). The action of destructive agents, such as kerosine emulsion—with or without oil—tends to cause a gathering of dust, &c., which fills up the spiracular orifices and causes asphyxiation.

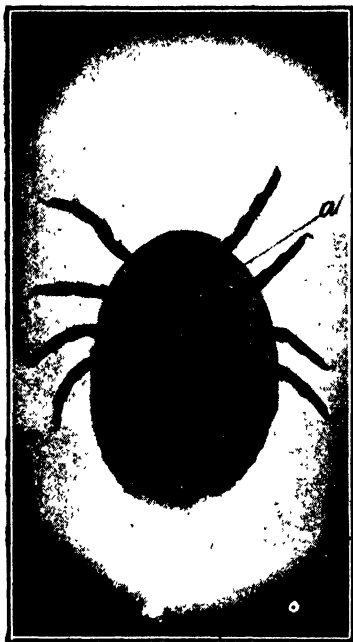


PLATE 27.



PLATE 28.

Plate 29.—Micro-photograph of full-grown tick x 6. A normally shaped adult female tick, viewed ventrally. The shape is characteristically oval and symmetrical. The mouth parts and their exact position on the adult are well shown, and we have a clear view of the position, attachment, and articulation of the four pairs of legs, each armed with its claws.

Plate 30.—Micro-photograph of mouth parts x 60. This enlarged view shows clearly the rostrum and palps, the articulation of which is distinct. The characteristic saw teeth of the mandibles is also seen, and some detail of the integument also.

Plate 31.—Micro-photograph of full-grown tick x 6. This photograph is from one of Mr. Poole's slides, and is highly interesting, as it clearly shows

the peripheral margin referred to in the description of the tick. In addition, in this typical specimen are seen the attachments of the coxæ of the limbs, the claws, and the mouth parts. In the foregoing descriptions sufficient explanation has been given to enable the practical poultry breeder to recognise and, if desired, study the tick and observe its habits in the various stages.

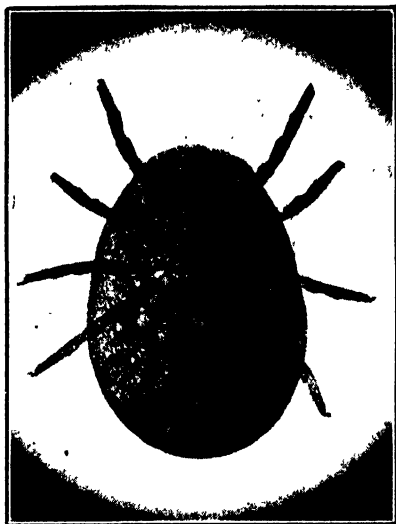


PLATE 29.



PLATE 30.

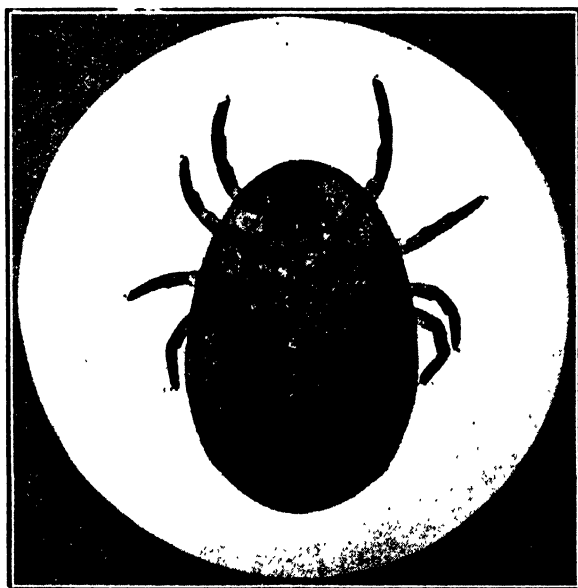


PLATE 31.

WHY TICK-INFESTED POULTRY DIE.

For many years I was at a loss to account for the deaths of fowls in many cases where there were comparatively few ticks present. In discussing the question, some six years ago, with Dr. A. A. Brown, of Victoria, I remarked that I was convinced that the tick left something behind in the bite. I asked Dr. Brown to follow this line of research. On visiting Melbourne some months later, Dr. Brown stated that he had discovered a protozoon which he believed was the cause of the septic symptoms. I was not aware at the time that important discoveries had been made in Brazil by Marchousi and Salimbeni; and that Balfour, in the Sudan in 1906 (the year I saw Dr. Brown), discovered the same causative organism. I had on many occasions noted that fowls which were swarming with larval ticks, and attacked at night by adults and others, did not die, but became emaciated and weak. After destroying the ticks adhering, and removing the fowls to clean quarters, they invariably recovered. Others, again, when perhaps only two or three larvæ were found attached, and only a few adults, &c., in the woodwork, exhibited symptoms of tick fever, prostration, high temperature, and early death. It seemed that the only explanation was that some ticks were apparently venomous, and others merely weakened the fowls by sucking their blood. The discoveries in Brazil, the Sudan, and elsewhere, gave the required explanation and confirmation.

In Queensland (1908) Dodd discovered the organism known as *Spirochæta Marchouxi*. In 1911 Gilruth announced the discovery in Victoria, and shortly after J. F. McEachran, M.R.C.V.S., the South Australian Government Chief Veterinary Surgeon, made some experiments with ticks procured by me from the north of this State. As a result of his work the spirochæte was demonstrated as the causative agent of tick fever among poultry in this State. Jowett reports the occurrence of this organism at the Cape. I do not propose to consider the life history of the spirochæte, as I have no personal records. I propose investigating the matter at a later date. The spirochæte, although only visible with the higher powers of the microscope, is a comparatively large organism. Jowett records some as 25 and even 30u in length and with 7, 8, or 9 spirals ($1u = \frac{1}{25000}$ of an inch). In the reports quoted, those interested will find detailed accounts.

Dodd reports that the spirochæte, in cases of inoculation from fowl to fowl, soon loses virulence unless reinvigorated by passage through a tick. Balfour, however, states that this refers to adult fowls and not to chicks. The tick, while feeding, discharges from the inter-coxal spaces a fluid. Balfour states that this fluid contains the spirochæte, and thus the site of the bite is infected.

IS THERE A CURE FOR TICK FEVER ?

Poultry breeders whose premises are tick-infested constantly report large losses among their poultry. For some time many of these outbreaks of

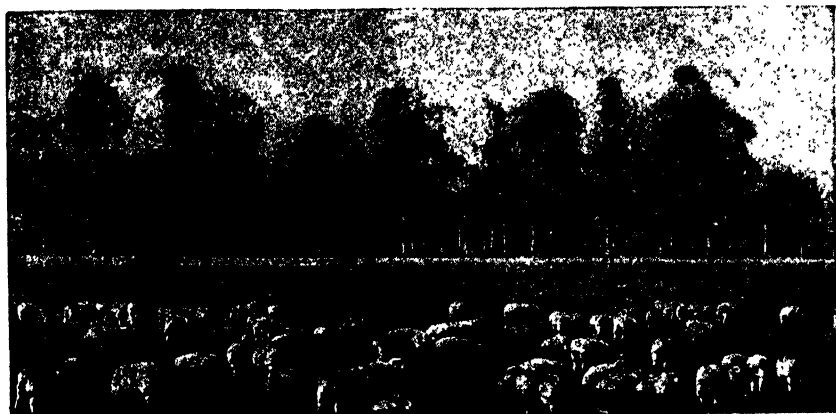
sickness were puzzling. With extended experience it soon became apparent that diseases of a generally similar character could in practically every instance be traced to the tick. Prompt eradication of the pest generally saved the remainder of the hitherto unaffected birds. Comparatively few fowls recover from tick fever, or spirochaetosis, as it is scientifically termed. In the hands of the ordinary breeder there is no known remedy. Dipping, or the application of some tick destroyer, such as kercsine and oil, certainly gives the bird a chance; but as a rule the damage is done and the blood is swarming with the organisms.

Dodd reports having experimented with injections of one of the organic arsenic compounds, soamin (syn atoxyl) (para-aminophenylarsonas) ($C_6H_7NAsO_3Na$). Doubtless some excellent results would occur from the use of one of the more recently investigated arsenic series.

Balfour quotes from the reports of several investigators who have used the now celebrated "606" (salvarsan) or dioxydiamido-arseno-benzol with excellent results.

It is my contention, however, that the proper procedure is to eradicate the tick. As long as ticks are allowed to infest premises, so long will it be unsafe to keep poultry. Further, as it is known that ticks occasionally bite human beings and seriously incommode them for some weeks, the destruction of the tick is all the more imperative. To bring about this much-desired state of affairs has prompted me to direct attention to the tick and its habits.

The free use by spraying, and even soaking the poultry houses, fences, &c., with 10 per cent. kerosine emulsion will very soon destroy ticks, but old harbors must be destroyed.



GRAPE VINE PRUNING FOR AMATEURS AND BEGINNERS.

By GEO. QUINN, Horticultural Instructor.

(Continued from page 30.)

THE THOMERY SPALIER.

This is the spalier most commonly applied by growers to table-grape vines when planted in strong soils, as well as by irrigationists in the production of grapes for raisins.

TYPE.

The type consists of a perfectly vertical stem carried to such a height as may meet the requirements of the trellis, as described later; and out of this, on a level with the wire or other support against which they will be secured, two arms emerge in a horizontal position, making on each side, as nearly as possible, a right angle with the stem. On these main arms the fruit-bearing shoots, consisting of spurs and rods, or spurs only, as the variety demands, are located at distances as nearly equal as possible apart. The general practice is to establish the spurs 6in. to 9in. apart when used alone, and rods accompanied by spurs are not permitted to remain closer than from 15in. to 18in. distant from each other.

FORMING THE VINE.

Assuming the newly-set plant has been pruned back to one spur of one or two buds only during the previous winter, in the early summer a strong shoot is encouraged to grow from one of these in a vertical position. To secure exactness, as soon as the height desired for the stem is reached, attention should be given, and when this point has been passed by several leaves upon the tender tip of the shoot, this tip should be pinched off back to the bud immediately underneath the desired height (see (a) Fig. 21). In a few days another shoot arises from this bud, but being weak at the start, it forms very close joints, *i.e.*, short spaces between the buds. This shoot is nipped off at the point as soon as it reaches about an inch in length, but its successor is allowed to persist and gather strength for the remainder of the summer. The distances, however, between the lowest buds upon it remain unlengthened (see (b) Fig. 21).

At the next winter pruning the shoot is cut off at the desired height just above where the growth started last summer after the second pinching was administered (Fig. 21 (c)). Here two buds will be found almost on a common level which, in the coming spring, will usually start as these have done upon (b) Fig. 22. The average vinegrower, however, will not give the necessary attention to secure these exact results, and the writer knows of many instances of well-balanced arms being secured by following the practice of one summer pinching, as illustrated in (a) Fig. 22. In this the shoot is trained up against a support vertically—a tall stake will answer until the desired height be attained—when it is pinched off to the bud immediately under that point. The young growth which rises from the top bud usually makes a weakly



Fig. 21. — Forming the Thomery Spalier, dotted lines showing positions of (a) First Pinching in Summer, (b) Second Pinching in Summer, (c) Next Winter's Pruning.

start with several internodes, each only about an inch long; but as the shoot swells these appear to shorten, and when at the next winter pruning the shoot is severed at the wire, or position where the top of the stem is to be, the growths resulting from the two topmost buds emerge sufficiently near to a common level to secure for all practical purposes evenness of balance to the main arms of which they are the foundation.

Whichever of these methods are adopted, the shoots from these two buds are encouraged during the next summer to make strong growth. After they have extended about 1½ ft. and lost their brittleness, they should be bent down to a horizontal position. Although this operation retards to a certain extent their vigor, it is essential for the purpose of securing that perfectly

horizontal direction which could not be so readily reached when the shoots have stiffened to the degree attained by them when the next winter pruning season arrives. When this time comes around the vine will have assumed the shape indicated by (b) Fig. 22, with the exception that small laterals will probably have grown from some of the buds upon the horizontal arms. These arms are now shortened back to a length which may vary with the respective vigor of each, the weaker one being shortened more than the stronger. In no case should these arms be retained to a great length—about 3ft. or 4ft. is quite long enough for the most extended development, whilst on the average from 1ft. to 2ft. will be safer lengths to adopt. The danger of allowing long extensions during the first season or two arises from

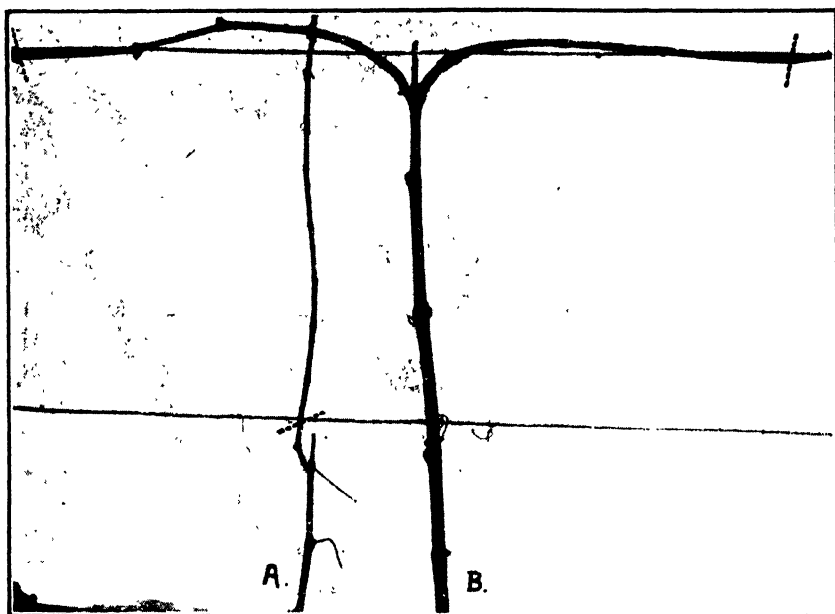


Fig. 22.— Forming the Thomery Spalier. A, Shoot with ordinary development after being pinched once in Summer; position of Second Winter Pruning dotted. B, Resulting growth before Third Winter Pruning at dotted lines.

the fact that the buds upon such arms rarely break into growth with the regularity desirable, and consequently unduly long spaces remain unfurnished with fruiting wood. When severing the canes which are to be laid down for main arms, care should be taken to bend each one into the horizontal position it will assume when tied, and then cut it off *through the node immediately beyond a bud which occupies a position upon the underside of the cane*. The section is cut through the node, or bud knot, to permit tying operations being performed with complete safety to all buds upon the cane. The reason for retaining the terminal bud upon the *underneath* side of the cane is to

ensure that *the curve made by the terminal shoot shall lie below the line of the parent cane*. Such a curve will straighten up as time passes, but the bend made by growth from a bud situate upon the top side of the cane does not readily sink to the level of the rest of the arm even after the lapse of many years, and during all of that time it acts as an impediment against the free flow of the sap to the portion of the arm situated farther out. If any small laterals have arisen from these horizontal canes during the first summer they should not be cut as spurs, but suppressed completely, as a bud to be seen at the base of each one will replace them in the coming summer. It goes without saying that any side shoots upon the stem, or suckers from beneath, should have been suppressed in the previous summer; but if any such remain at this winter's pruning they must be completely eradicated.

The appearance of a Thomery spalier before receiving its fourth winter pruning may be seen at Fig. 23. It will be noted that the buds upon both arms

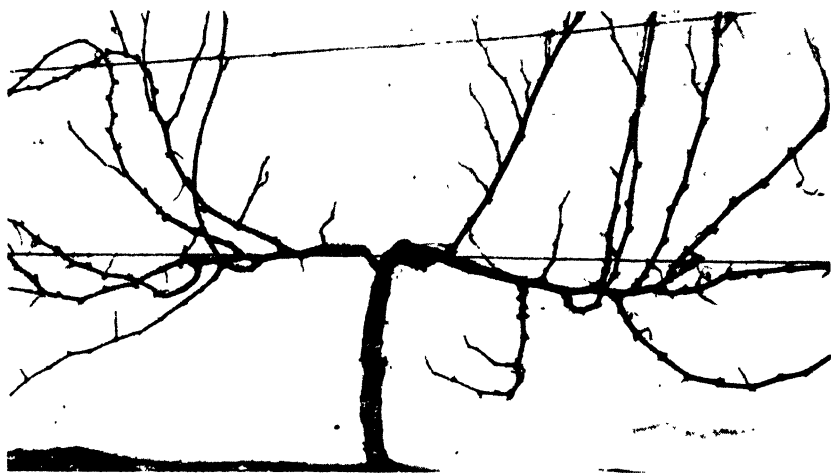


Fig. 23. Thomery Spalier before Fourth Winter Pruning.

have, without exception, grown into fairly strong shoots. They are, however, much too closely placed upon the parent limbs, and many must be suppressed. The attention of the reader is drawn to a shoot emerging from the arm on the right of the picture, near to its junction with the main stem. This shoot is the most vigorous on that side. This vigor is due to its close proximity to the main stem, and thus obtaining more than its share of the sap. It demonstrates the necessity for observing a rule in designing the Thomery spalier, which *forbids the retention on the main arms of any spur or secondary arm within about a foot of the main stem*.

The pruning recommended for this vine is illustrated in Fig. 24, where it will be seen, besides the continuation rod, only two spurs have been retained

on each arm, and these are about 9in. or 10in. apart. The extension rods at each end have been cut about 15in. long, and the underneath buds have been again selected at the end of each rod. The downward bend upon the annual extension of the arm on the left of the picture is very pronounced, but the "pull" of the sap will straighten this up to the wire after a year or two has elapsed.

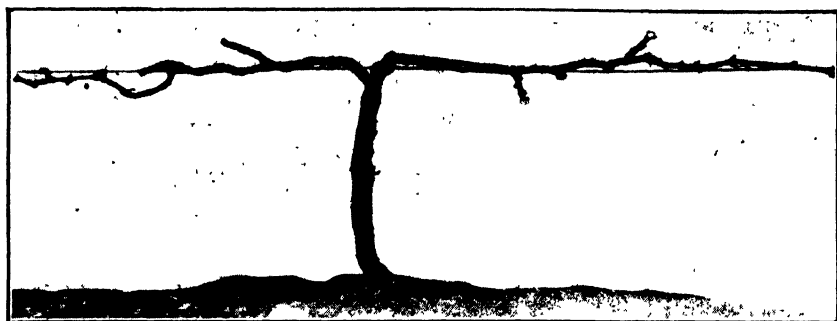


Fig. 24.—Thomery Spalier after Fourth Winter Pruning.

The after pruning of this vine would consist each winter of maintaining these spurs upon permanent arms, adding others on similar lines along the extension of the previous season, and laying down a short extension rod or spur until the space allotted to the arm be filled. From time to time, here and there, an exaggerated spur which has really become a short, crooked, secondary arm, must be shortened back to a watershoot which has arisen from its base or from the main arm, either at its junction with the old spur or thereabouts. A spur-pruned Thomery spalier of mature formation is illustrated in Fig. 25.

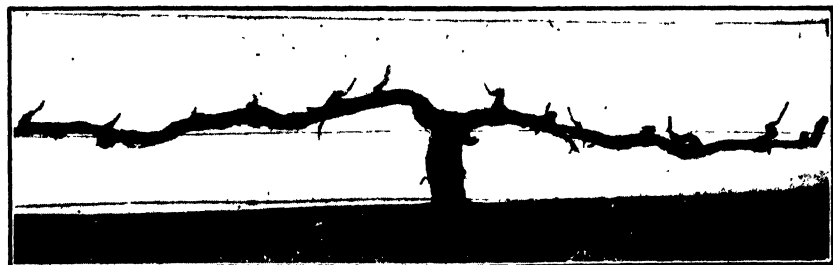


Fig. 25.—Mature Thomery Spalier; Spur Pruned.

In the case of such varieties of vines which need spur and rod pruning, instead of one shoot of the pair which arises from each spur being suppressed, that one farthest out from the main arm is cut to a rod and bent down, whilst its fellow arising from the bud nearest to the bottom of the spur is itself

pruned to a spur to supply two shoots for the next season's work. This rod, after bearing its fruit, is cut away completely at the next winter's pruning. This is shown in Fig. 26, which represents the modification of the Thomery spalier as adopted so successfully by the late Mr. Thomas Hardy, of Bankside, in the growing of the Zante currant. In this the great vigor displayed by the currant vine is allowed to expend itself in a larger number of spurs and rods, without massing the foliage and excluding the light from the buds and bunches beneath to the extent which takes place when all the shoots are distributed on the same plane as that assumed by the stem.

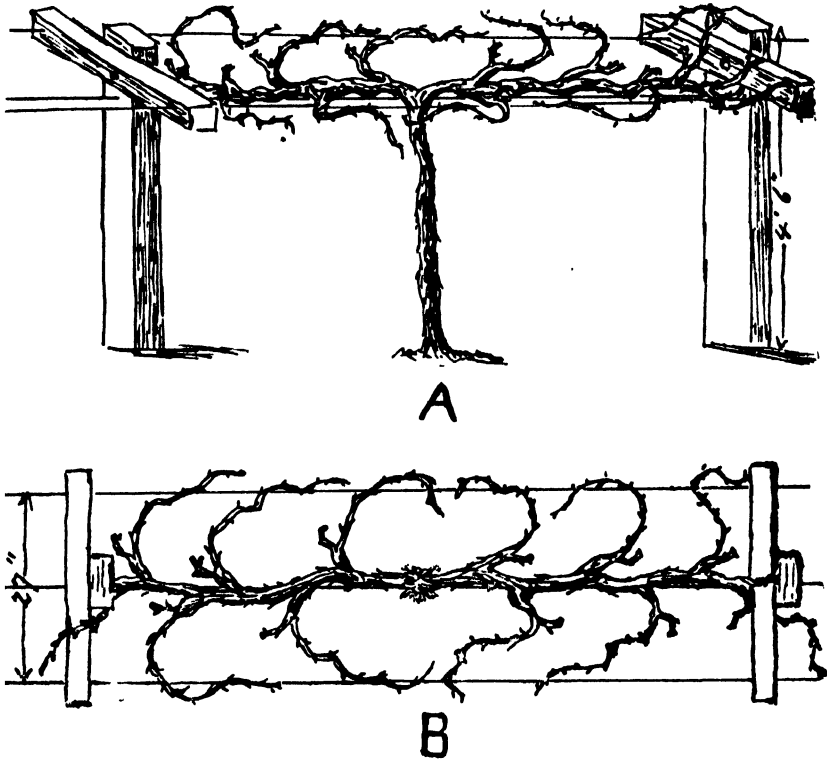


Fig. 26.—Hardy's T-piece Form of Thomery Spalier, used in growing the Zante Currant
A, Elevation of Trellis.

B, Ground Plan ; Vine viewed from above, showing spurs and rods.

The Sultana vine, depicted in Fig. 27, shows the type of Thomery spalier found most applicable to the training of that variety. This vine, it is true, is badly designed ; but the reader's attention is drawn to the very short main arms—not above 2ft. long—although the vine is about 12 years old. This modification is suitable to all vines the main arms of which have a tendency to run into spaces bare of spurs if extended far away from the trunk.

Among table grapes, Waltham Cross and Centennial display this tendency very freely. The pruning suggested for this vine is given in Fig. 28, from



Fig 27.—Sultana Vines trained as Thornery Spaliers with Short Arms.

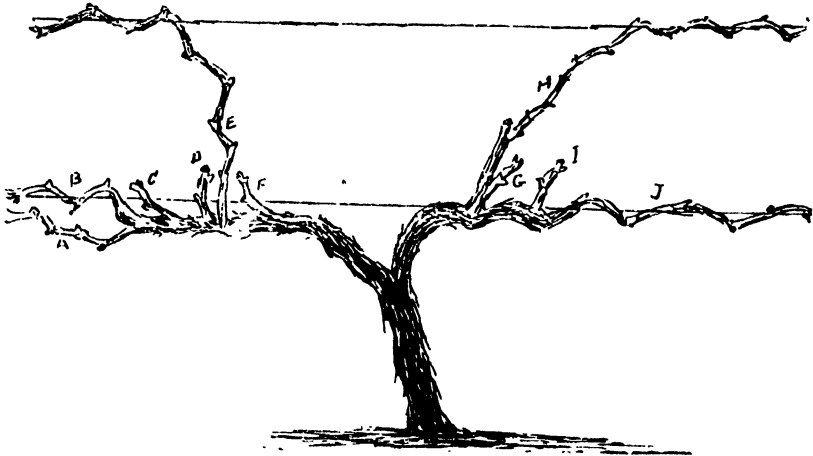


Fig. 28.—Thornery Spalter ; Pruning suggested for Sultana Vine in Fig. 27.

which it will be seen that the effort of the pruner is directed towards forcing out from the spurs on the main arms a number of very strong rods each season, about half of which are cut back to spurs, whilst a number—which

varies with the vigor of the individual plants, and even with that of the arms on the same plant—are retained for bearing the fruit in the coming season. These rods are twisted at the base and tied round in an arched form to the wire supporting the main arm, or raised to the next wire, around which they are freely twisted. When the vine is pruned the horizontally-trained annual rods are not used for the further extension of the main arms, consequently they are also twisted around the wires. The twisting recommended for the fruiting canes causes a steadier flow of the sap to the extremities of the vine. This reacts favorably upon the spurs, assisting in the production of

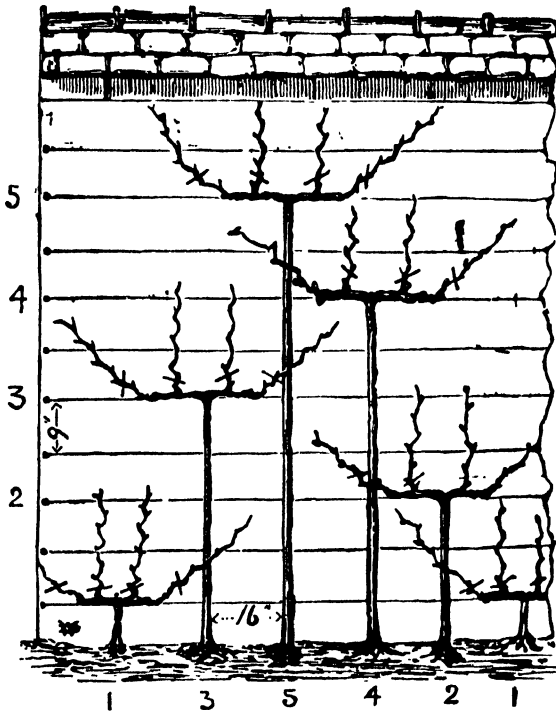


Fig. 29. - How to Cover High Trellis Work with Vines trained in Thomery Spalier (after Foëx). From "Vino Pruning," by A. T. Perkins.

a strong growth of canes for next season's use. It also regulates the supply to the buds upon the twisted canes themselves, assisting those situate near to the main arm as against undue absorption by those located towards the outer end, which otherwise would monopolise most of the vigor. The twisting should not be performed until the sap begins to move in early spring, otherwise the canes are too dry and brittle, snapping off too readily when bent. A strong-growing vine pruned thus tends to produce watershoots somewhat freely; but this, under intense cropping, has advantages in affording ready means of replacing spurs which fail to respond after the pruning—an effect somewhat common with the Sultana.

The Thomery spalier is adaptable to most vines when planted for the purpose of covering unsightly fences, high blank walls, training over lean-to structures, or pergolas for the formation of shady walks. In such cases several tiers of vines with stems of various lengths are utilised with ease.

HIGH TRELLISES.

In covering a high structure with trellised vines it becomes necessary to train a series of vines with stems of various heights, so that the rule of maintaining the fruiting wood upon a common level on each plant may be

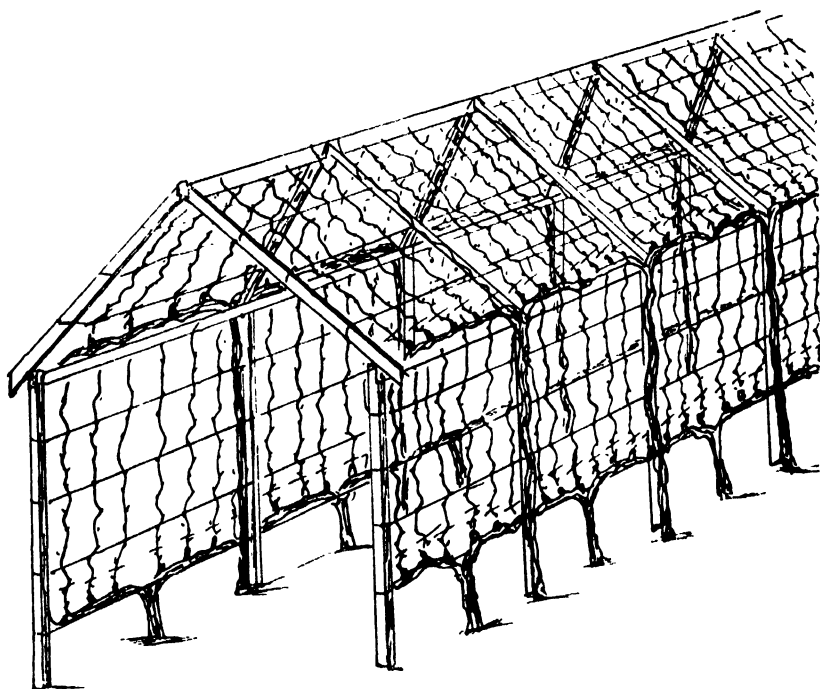


Fig. 30. - Vines Trained on a Gable-roofed Pergola. (The short cross lines indicate the positions for severing the canes each winter).

followed. To secure the necessary length of stem it sometimes takes several seasons to grow a shoot to the required height. If the growth from the young vine does not ascend sufficiently far above this required height during the first summer, it should at the next winter again be pruned back to a spur of a couple of buds to induce a vigorous response, and only one shoot should be allowed to grow therefrom. This is tied up vertically, and as it passes the required height its point should be pinched out in the summer, as previously described, for the purpose of securing short-jointed wood with closely set buds upon it.

If a high vertical surface is to be covered, such as is depicted in Fig. 29, the method adopted there may be followed in a series of five vines. If, however, the soil be good and the grower has a wall not more than about 16ft. high to cover, the series may be reduced to two vines, *i.e.*, a short-stemmed vine alternating with a long-stemmed one throughout, as is shown in the shaded walk or pergola drawn in Fig. 30.

In designing any of these trellises the lowest vines should have stems from 1ft. 9in. to 2ft. in length, but not less. In the case of gable or lean-to structures shown at Figs. 30, 31, 32, 33, the stems of the highest should be trained along the eaves. The annual shoots will then rise each season from the lowest vines and cover the side or vertical face, and those from the higher



Fig. 31.

extend from the eaves to the apex. If the vines be spur-pruned types, each season's winter pruning is reduced to the simplest form, consisting merely of cutting the annual growths back to spurs situate close down upon the horizontal arms, renewing any from watershoots from time to time as the case demands. Fig. 31 represents a cottage wall shaded by a lean-to structure carrying one short-stemmed spalier made of a Gordo Blanco vine 18 years old. This vine looks badly designed, but its stem has been buried by filling up the land, and the main arms raised on to higher wires than those upon which they were originally framed. This can be more readily understood by referring to Figs. 32 and 33, which show this vine without leaves, before and after

pruning respectively. On this trellis the central post supports a spalier which was also divided for a lower trellis, thus causing the main arms to be



Fig. 32.—Vine in Fig. 31 before Winter Pruning.

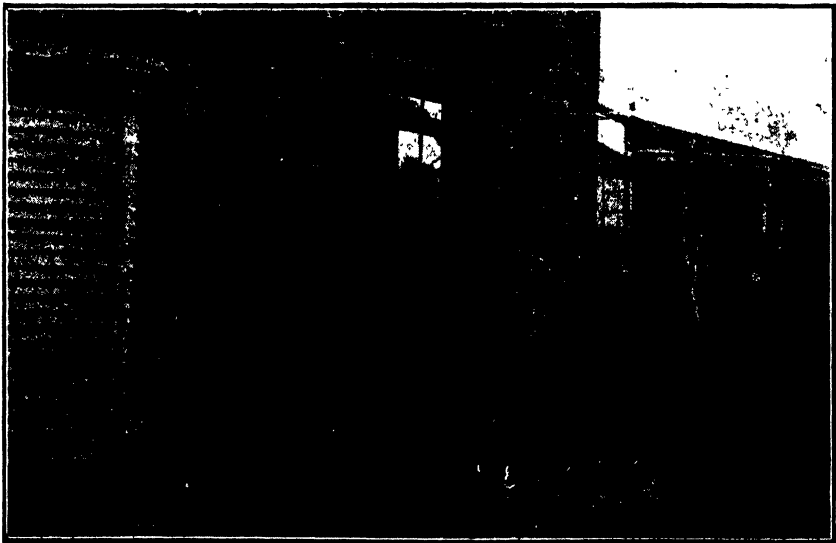


Fig. 33.—The Vines in Figs. 31 and 32 after Winter Pruning.

badly placed also. This vine is a Waltham Cross, and is rod and spur pruned, the fruiting rods or canes being bent down, as seen in Fig. 33. The vines

at the ends are of the Muscat Hamburg variety, trained as cordons and spur-pruned. These photographs serve to show how grape vines may, if trained on the principles outlined herein, be kept over a period of many years, not only in a fruitful condition, but each summer providing a perfect shade from the *ground upwards*, whilst, after they are pruned in winter, the walls or walks may receive the fullest volume of sunshine to warm and dry them.

CORDONS.

This term is applied to trellised vines which have one main arm only, produced from the main stem. Upon this arm the annual shoots are arranged in exactly the same manner as those upon the main arms of the spalier. The cordon is superior to the spalier, inasmuch as it is more simply formed, and the trouble of balancing the growths on each side of the main stem, more particularly after the vine is furnished with fruit wood, is avoided. Further, in exposed positions the cordons may be trained with the prevailing wind, thus averting considerable buffeting and breaking off of the shoots in the early stages of their growth. Another advantage is that, whilst in the centre of the spalier there are about 2ft. of main arm space on which it is unsafe to permit any fruiting wood to grow, in the case of the cordon there is only half this length on each vine devoid of fruit wood, and that space is readily utilised by causing the terminal end of the main arm of one cordon to lengthen until it overlaps the bare space on the next.

There are many forms of cordons, known respectively as vertical cordons, oblique cordons, and horizontal cordons. In the vertical cordon the main stem is simply extended a little year by year straight up the vertical surface of a wall or other structure, and the fruit wood disposed at regular intervals along its length. This is a very difficult plant to control, for the reason that it violates the primary rule whereby it is possible to obtain an even diffusion of sap in the annual shoots.

Oblique cordons are so called because of the projection of the main stems or axis in an oblique direction. This is also clothed with fruit wood along its length, and it is likewise open to the objection raised against the vertical cordon, viz., the difficulty of maintaining an even distribution of the sap to all parts of the vine, though usually not to the same degree as with the more vertical method. If planted in series against high trellises only the upper half of the stem on a vertical or oblique cordon carries fruiting wood.

The forms of the cordon which have found most general acceptance in the vine-growing countries of the world are those possessed of a horizontal main arm, thus permitting the most permanent results being obtained from the manipulation of the fruiting wood.

HORIZONTAL CORDONS.

The principal authorities on the training of the vine have described three types of horizontal cordons, viz., the Guyot, Sylvoz, and Casenave. The former, which is suitable to rod-pruned varieties only, may be briefly described as a short-stemmed vine, carrying one spur and a rod. The rod is bent down and fixed to a horizontal wire, and the side shoots from it are severely summer-pruned. The growths from the spur are tied up to a vertical stake to assist their vigor. Each winter the rod of the previous year is cut away, and of the two shoots from the spur one is laid down for a fruiting rod, whilst the other—usually that one situate closest to the parent stem—is cut to a spur of two buds to provide the wood for next season's operations. This type has not met with the approval of Australian vigneron, being, it is said, not suited to our conditions.

The Sylvoz cordon consists of a main stem which is raised to the desired height and then bent over at right angles and produced from year to year along in a horizontal direction. The fruiting wood is pruned to spurs at first, but afterwards retained as rods only when the vine is fully formed. These rods are bent down sharply to a lower wire and tied pretty well in a vertical position, or at right angles from the main arm. The system appears simple, as each year the rods of the previous season which have fruited are suppressed back to the shoot nearest the main stem, and this is bent down as a rod to do duty as its parent did in the season just past. In practice, however, the attempts to bend the rods with sufficient abruptness to force the growth from the buds upon their lower or basal portions have resulted in a very large percentage of them snapping off. When not bent sufficiently the buds upon the terminal portion of the rod make the most growth; and, in fact, in spite of their inverted positions, seriously rob those situate nearer the main arm. Anyone practising this method of training would act wisely in allowing the rods to remain unbent until the sap has started in them, when they withstand sharp bends, and even twists, to a very much greater extent than in the dormant winter season. This system, like Guyot's, is suited to rod-pruned vines only. It needs a three-wire trellis, and Mr. A. J. Perkins, the Government Viticulturist of this State, recommends the lower wire to be set 20in. above the soil; the middle one, on which the main arm is trained, 16in. higher; and the upper wire, to support the annual shoots, 20in. above the second wire. This means a trellis 4ft. 8in. above the soil, and in most places it would prove an expensive structure.

THE CASENAVE CORDON.

This is the form of cordon which has proved most appropriate for our conditions, and is gradually superseding all others. This cordon consists of a vertical stem grown to the height desired, and thence turned at right angles along a horizontal wire or support. Along its length, at intervals of

12in. to 15in., are disposed a series of rods and spurs on such varieties as need rod-pruning. If of a spur-pruned variety, the spurs are allowed to remain closer together, say, from 8in. to 10in. apart. If for rod-pruned kinds, set



Fig. 34.—Two-year Old Vine, Unformed.

in open land, three wires are necessary in the trellis, arranged as for the Sylvoz cordon, the middle one carrying the main arm of the vine, the lower supporting the bent-down rods, and the upper the annual wood. In modifications, however, two wires only are sometimes used, as seen in Fig. 39, the rods being tied over to the wire which carries the main arm. If three wires are used, the bottom one may be 12in. above the soil, the middle wire 24in., and the upper one 12in. to 15in. above the second wire. In the case of spur-pruned varieties, two wires are sufficient—one to carry the main arm 2ft. above the soil and a second to support the annual shoots, stretched at about 15in. to 18in. above it.

FORMING THE VINE.

As in the case of all previously described vines, the newly-set plant is pruned to a short spur. During the next summer its growths are trained up a stake. If time be available, the energy of the plant may be directed into one good shoot; and this, after passing the desired height for the stem, could be bent along the wire which shall carry the main arm. Usually, however, the plant is permitted to make a number of shoots and laterals during the first summer, and 12 months after planting, when the second winter's pruning time arrives, the plant resembles the vine in Fig. 34. In

such a case the growth of the strongest cane is sufficiently stout to permit the main arm being laid down; and in Fig. 35 this has been done, and about

1ft. of the arm has been laid along the wire, all other shoots being completely suppressed. When about to perform this work the cane which is to be saved as a main arm is bent down along the wire, and at the length where it is to be severed a bud situated on the *underneath side* should be selected

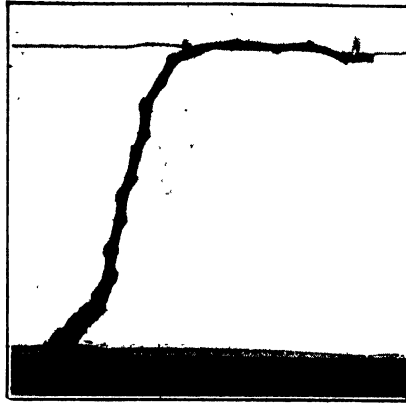


Fig. 35.—Two-year Old Vine Cordon-pruned.

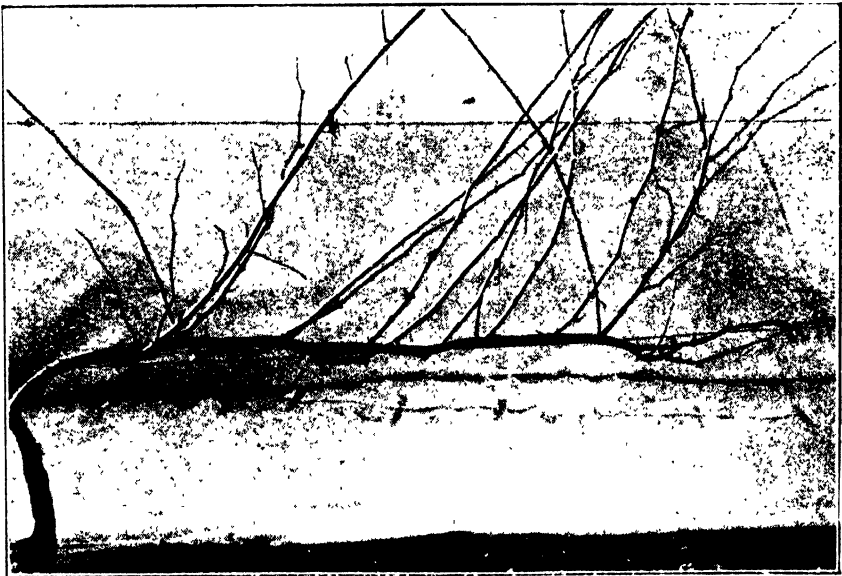


Fig. 36.—Strong Vine before Third Winter Pruning.

as the terminal bud, and then the cane severed through the next node farther on ; the object of this precaution being, as has been explained in connection with framing spaliers, to assure the formation of only a slight *inverted arch* at the junction of the growths of the old and new extensions.

At the next winter's pruning the vine in Fig. 35 would probably possess half a dozen good canes, and of these the terminal one would be cut to about 15in. or 18in. in length and laid down for further extending the main arm, whilst about two others would be pruned back to spurs of two buds each; the spur nearest to the main stem being at least 10in. out along the arm, whilst the second would be close up to the end of the first year's length of arm.

Fig. 36 shows a much stronger vine, which had about 3ft. of arm laid down the first year, and its third winter pruning (*i.e.*, two years after planting) is indicated in Fig. 37, and four spurs, with an extension rod about 18in. long have been saved. Each of these spurs will give rise to two shoots, and if it be a variety requiring to be rod-pruned, next winter one on each spur will be reserved as a rod to produce the season's fruit, whilst the other will be cut back to a spur to make the necessary shoots for next season's work.

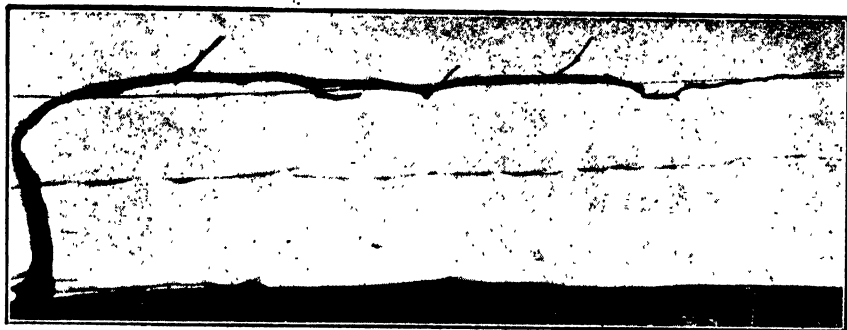


Fig. 37.—Vine in Fig. 36 after Third Winter Pruning.

The vine may now be said to be formed, and the annual pruning consists of suppressing suckers, watershoots, and any superfluous canes along the arm, bending down the canes or rods selected for fruit bearing, and pruning to spurs those most suitably situated for maintaining the shape of the vine and restraining it within bounds. At the same time as this is in progress the terminal cane is continued on from year to year, until such time as the main arm has overlapped the bend of the next vine and made along the trellis one continuous line of main arms furnished with annual growths.

Figs. 38 and 39 illustrate these facts; the first-named being yet in the process of extension towards the next vine, and the latter, having just about linked up the chain of cordon arms, is provided with abundance of rods to use up its very apparent vigor of vegetation. It will be noted that in Fig. 39 the continuation has been pruned to a mere spur only. It may be remarked that should time permit during the summers in which the vine is undergoing its processes of extension, the terminal shoot may be bent down to a

horizontal position whilst it is growing, as this favors the formation of a more perfectly straight main arm than is possible by the use of winter pruning alone.

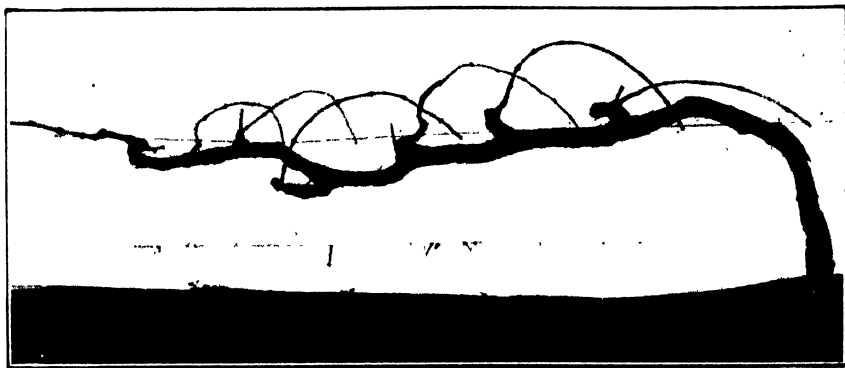


Fig. 38.—Cazenave Cordon of Moderate Strength Rod-pruned.

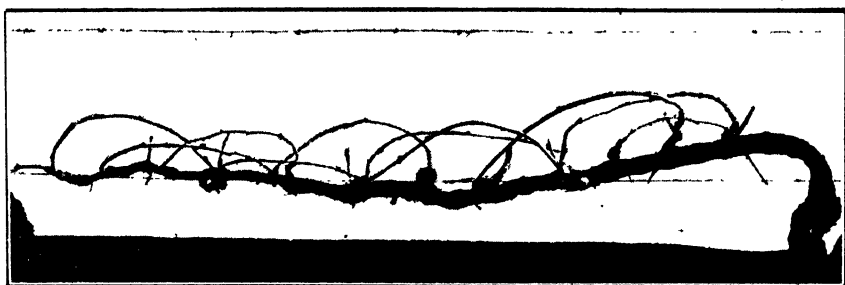


Fig. 39.—Cazenave Cordon. A very Strong Vine with Numerous Rods.

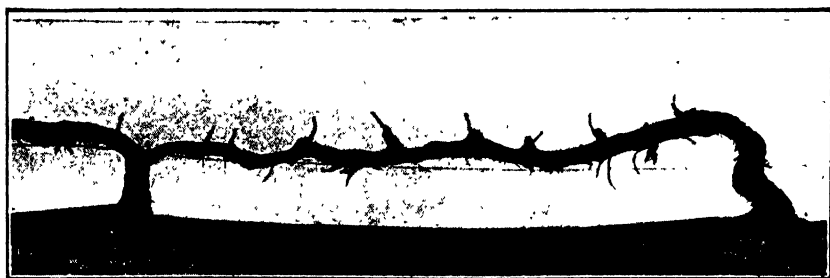


Fig. 40.—Horizontal Cordon (Spur-pruned) Overlapping next Vine.

In Fig. 40, a matured design of the spur-pruned Casenave cordon is shown. The overlapping by the terminal of the main arm over the butt of the next vine is also noticeable. This is the type now widely followed by growers

of the Zante currant when submitted to the operation of cincturing or ringing at the period of blossoming, it being found that this vine, under such training, produces abundantly upon spurs of three or four buds.

Fig. 41 gives a general view of trellised vines in the vineyard at Roseworthy Agricultural College. In the foreground Casenave cordons are to be traced, and the distance is filled with Bordelais spaliers. The attention of the reader is incidentally called to the fine cover crop of field peas being grown between the rows of vines to be ploughed down for green manure.



Fig. 41.—Cazenave Cordons in the Foreground ; Bordelais Spaliers in Distance

It may be mentioned, in passing, that cordon-trained grape vines, such as are described herein, may be used for the purpose of shading covered walks and bare walls with equal success to the spalier forms and with much less trouble to the grower. In setting out the plants they should be placed in series of two, three, or four vines, as the height of the structure to be covered may demand, keeping in mind that the greater the number in the series the closer the plants should be set to each other.

Whatever number be selected the pruner should bear in mind that the golden rule of permanently successful training consists in keeping all the fruiting wood grown from any one vine upon a common level, so that the sap may be distributed evenly to all parts.

The following varieties are recommended for trellising, as spaliers or cordons, over ornamental structures and upon high surfaces, because they display much persistency in retaining their spurs or secondary arms in regular order upon the permanent arms :—Black Frontignan, Black Hamburg, Doradillo, Grand Turk, Muscat Gordo Blanco, Muscat Hamburg, Red Prince, Royal Ascot, Sweetwater, Temperano, Wortley Hall, Crystal, Red Frontignan, Zante Currant. Of these the most suitable for forming the higher tiers of any series are Grand Turk, Red Prince, Sweetwater, Royal Ascot, Crystal, and Zante Currant.



EXTRACTS FROM REPORTS BY TRADE COMMISSIONER.

The following are extracts from reports dated London, July 26th, received from the Trade Commissioner :—

INTERNATIONAL ASSOCIATION OF POULTRY INSTRUCTORS AND INVESTIGATORS.

In accordance with instructions from the Honorable the Minister of Agriculture, Adelaide, I attended a Conference that was held in London in connection with the above association. The Conference was opened on July 18th, 1912, and closed on July 24th.

This has been one of the most useful and instructive Conferences it has ever been my pleasure to attend, and I am quite sure that when a detailed report of the whole proceedings is available, it cannot fail to be of interest to the poultry-keepers in South Australia. I strongly recommend all concerned to obtain a copy and very carefully peruse it.

In order that our producers may have some idea of the nature of this report, I give herewith a brief review of the proceedings of the Conference.

It only needs a glance at the list of countries represented to realise the international constitution of the association. The title of the association might lead one to imagine that the whole of the deliberations of the committee would be confined to the scientific side of the industry ; but this was not the case. The committee fully realised that the commercial aspect was just as

worthy of consideration as the scientific, and grasped the fact that the efforts of the scientific men would lose very much of their value unless those interested in the industry commercially also took steps to improve existing methods. Accordingly, the term "Instructors" is meant not only to refer to those actually engaged in teaching how to breed, feed, &c., but also those who are engaged in finding markets and giving instruction as to the best methods of preparing poultry and its products for the markets. It will, no doubt, be gratifying to South Australians to learn that there was not a member present at the Conference who was not well acquainted with what is being done in South Australia in regard to egg-laying competitions, and in a smaller degree scientific research, particularly when it is considered the comparatively small amount of money available for such purposes compared with other countries.

Owing to the world-wide reputation South Australia has attained, due to the magnificent results of the egg-laying competitions, the State itself, and many of its well-known breeders, are known to nearly every member of the Congress. While speaking of egg-laying competitions, I might add that the fact that the competitions in South Australia are carried out under Government supervision adds much to the importance of the wonderful figures we are able to give. The paper prepared by Mr. D. F. Laurie and read by myself, on the "Poultry Industry in Australasia," was much appreciated. One important lesson we have to learn as a result of the information given in the paper, and also of the results of the egg-laying competitions, is that English and foreigners alike are surprised to learn that the poultry industry, in Australia is of so comparatively small commercial value. I gathered from the many remarks which were made that any other country with the natural advantages obtaining in Australia for poultry-keeping would have raised the poultry industry to a leading place among its industries.

Facts given by Dr. Pearl, of America, in regard to the poultry industry in that country are simply astounding; but, as all this information will be given very fully in the general report, it will be unnecessary for me to go into detail now, other than to say that for teaching purposes alone the United States of America Government vote half a million dollars annually; and during the last five years, no less than 20,000 qualified students have passed through the various colleges in the States. When one considers the above facts, it is little wonder the poultry industry is worth annually over 1,000 millions sterling to the country. From an account given by Professor Graham, of Guelph College, Ontario, it will be noticed that the Canadian States are also emulating their neighbors over the border. A very important point to be noticed in connection with the continued advance of the industry in America and Canada is the fact that, though the production is annually increasing, their exports are falling away, and local prices advancing. The secret of this is that in these countries the Governments do not stop when they

have instructed the farmers, &c., how to produce, but have carried their investigations on to commercial lines, and are teaching the people how the poultry and eggs should be prepared and collected for market. They realise that to increase local consumption, the value of poultry as a food should be forcibly brought before the public; that if this propaganda is to have any effect the goods must be of the freshest and most attractive character. Eggs, a fortnight old, that have been exposed to all conditions of weather and methods of collection, packed in any sort of old box and chaff of doubtful character, would not appeal to the American or Canadian public.

The position of the industry in Germany, as explained in the report, is worthy of most careful consideration, particularly in view of the effect it is bound to have on the English markets; though, from a producer's standpoint, there is little to learn, as little progress has been made for many years. The chief point to be observed is the enormous increase in the consumption of fowls and eggs in Germany. There are several reasons for this increase in consumption, amongst others the following may be regarded as the most important:—

1. *Growth of Population.*—In 1880, the total population was 45,000,000; in 1910 it was close upon 65,000,000, and is growing at the rate of about 900,000 per annum.
2. Almost the whole of the additional increase in consumption is in the large manufacturing centres and not in the agricultural districts.
3. Owing to the increase in the general prosperity, and the consequent higher standard of living, as well as the adoption of English and other ideas as to breakfast due to the enormous increase in the number of Germans who now travel.

For many years, at any rate, Germany must be a very large importing country, and accordingly, eggs and poultry from Russia and neighboring countries, which in the past have found a market in England, will be diverted into other channels nearer home, thus leaving England to look for sources of supply elsewhere. I have called attention to the details relating to the countries mentioned to show what may be gathered from the report under review, not only in regard to them, but to other countries represented at the Congress. The main object of the association is to acquire and disseminate information in regard to the poultry industry from and to all parts of the world.

The central office is in London, to which members from all over the world may apply for information on almost any subject appertaining to the poultry industry. The association is governed by a council consisting of members from many different countries. Mr. D. F. Laurie and myself were elected to represent Australia on the council. The condition under which members may join the association, and the very many advantages to be obtained

therefrom, will be found in full detail in the report. This movement is having the practical support of the British Government, and also of the Royal Agricultural Society of Great Britain. Both Lord Lucas and Lord Middleton have taken a very keen personal interest in the proceedings, and it is fully expected that, in addition to the official recognition the association has already received from many foreign Governments, very practical help will be forthcoming.

Owing to the fact that the report has to be compiled in so many languages, it will be some little time before it is available.

Immediately, however, I can obtain a copy I will send one to you. In my opinion, that report will be of the very greatest value to the poultry-keepers throughout the State. I respectfully suggest that such a number of copies be purchased as will allow of the report being placed in all country institutes and other places where they would be available for reference.

FROZEN MUTTON AND LAMB.

Prices are practically the same as last reported. The market continues slow and quiet, and, owing to the strike, which particularly affects the lighter-men, the goods have still to come up by road. In my opinion, this is really the cause of prices remaining the same, *i.e.*, the delay in getting the supplies from the ship to the market.

	Mutton.					Lambs.			
	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>		<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>
New Zealand	2	3	to	2 10	..	3	9	to	4 0
Australian	2	5	"	2 6	..	3	5	"	3 8
Argentine	2	2	"	2 5	..	3	4	"	3 8

The quotations on Argentine lamb and mutton are practically nominal, as supplies are exceedingly short on this market.

ARRIVALS SINCE LAST ADVISED.

	Mutton.		Lamb.	
Australian	22,341	..	16,395	
New Zealand	45,639	..	95,049	
Argentine	40,282	..	24,817	

TOTAL QUANTITIES NOW AFLOAT.

	Mutton.		Lambs.	
Australian	305,000	..	60,000	
New Zealand	528,000	..	764,000	
Argentine	274,000	..	112,000	

BUTTER.

The market is much the same as when last reported. There has been little business in Colonial butter, but increased supplies have been coming from Siberia. This week has been a record for some long time now for this class of butter. The remarkable feature in the position is the high price of Danish when compared with Siberian. Only this morning I was comparing Siberian with Danish. It was most difficult to decide which was the better of the two butters; and what was my surprise when I was told that there was at least 20s. difference in the cost. This, to my mind, is another instance of the grip that the Danes have on this market. After all, it is a matter of prejudice, and one that I think Australians as a whole should, in their own interests, take some steps to break down. There is still a very considerable quantity of Australian butter in store in London. For the best we are realising from 104s. to 108s., while ordinary fine quality is realising from 98s. to 102s.

CANNED MEATS.

While the very hot weather that has obtained for the last week or two has very materially assisted the sale of such canned goods as salmon and fruits, it has had the contrary effect on the demand for canned meat in tins (6lbs.). The retailers are afraid to open packages of this size on account of their becoming so quickly discolored and going bad. For the very best pack of Argentine corned beef there is a steady demand at from 33s. to 34s. per case, whilst for the ordinary Australian qualities the market is exceedingly slow at from 24s. to 27s. As a matter of fact, if one wanted to clear a big parcel it would be a matter of considering from 20s. to 22s.



A Glimpse of Mount Gambier.

BEE-KEEPING NOTES.

FOUL BROOD.—ITS SYMPTOMS AND TREATMENT.

By T. E. WHITELOW, Inspector of Apiaries.

The wellbeing of the beekeeping industry in South Australia has suffered considerably in the past from the devastating disease known as foul brood. In certain districts apiarists have experienced great difficulty in keeping their bees healthy and vigorous. Recent inspections have shown that this difficulty has been increased by careless beekeepers leaving diseased combs about in exposed positions, thus proving a dangerous source of infection to other bees in the vicinity. In one instance a neglected apiary of 20 hives was discovered, all of which were diseased, and only one solitary hive was inhabited by bees. The remaining 19 hives were being actively robbed by the bees from neighboring apiaries. The onus is on every beekeeper to do his portion of the work of eradicating this disease, and the neglect of a few apiarists cannot be allowed to endanger the livelihood of others who are depending upon honey production as the principal source of income.

The need for active supervision being evident, a vigorous policy has been adopted by the Department of Agriculture. The enforcement of the Foul Brood Among Bees Act, No. 410 of 1887, has had a beneficial effect in removing these sources of contamination. Examinations are being made of the apiaries throughout the State, and where diseased bees are found a careful inspection is made to ascertain whether safe and efficient means are being taken to eradicate the disease in accordance with the clauses of the Act. If no treatment is proceeding, the beekeeper is given a reasonable opportunity to commence action, and, failing this, more stringent methods are adopted to enforce the Act. This policy has the strong support of the beekeeping community throughout the State, and in most instances inspection is appreciated as a safeguard.

The well-informed apiarists are men who are fully aware of the highly infectious character of the disease, and immediately its presence is detected in their apiaries, take drastic measures to stamp it out. They know that one single diseased cell in their hives is as dangerous in its consequences as a lighted match idly thrown down in scrub country during hot, dry weather.

There is always a percentage of beekeepers who are unacquainted with the diseases of bees and the best methods that should be adopted when

treating contagious diseases. Beekeepers have been visited who were unaware of such a disease as foul brood, and yet inspection revealed its presence in their hives. It has therefore been deemed expedient to issue a pamphlet describing the disease, its effects, and the usual methods adopted to ensure its cure. It is not only useless to enforce the provisions of the Act, but it is positively dangerous to do so unless steps are taken to ensure the treatment being thorough, and without infection to neighboring apiaries. A pamphlet on the subject will be an assistance to some beekeepers in effecting expeditious and safe treatment that is likely to be permanent in character.

Foul brood is generally known to be a disease which is not readily cured once it has obtained a strong hold in the apiary, and it is also recognised that drastic treatment must be adopted to effect a cure. The modern system of beekeeping, with its interchangeability of bees, hives, combs, and appliances, materially aids the ready detection and treatment of the disease by competent apiarists. When this system is adopted by beekeepers who do not completely realise the contagious nature of foul brood, then indiscriminate manipulation and exchange of movable parts renders the spread of infection more rapid than with old methods.

THE CAUSE.

The disease is caused by pathogenic micro-organisms attacking the immature larvæ in the brood combs, causing their death and subsequent decomposition. There has been much controversy with regard to these germs, and present-day knowledge concerning them and their relation to disease in bees must always be open to revision as further investigations throw more light on the subject. It is to be regretted that much of the information available is vague, and appears to be based more on conjecture than upon tested truths.

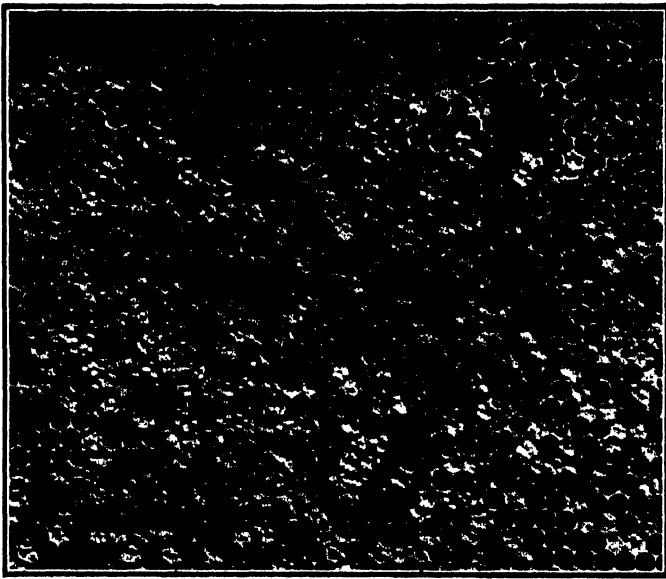
Three organisms are supposed to be pathogenic to bees in connection with foul brood, and are present in different phases of the disease—*bacillus alvei*, Cheshire; *bacillus larvæ*, White and *streptococcus apis*, Maasen.

THE SYMPTOMS.

Two types of foul brood are known, both of which are contagious. One is predisposed to attack the larvæ in the early period of its existence, before it is sealed within the cell. The other variety seems unable to obtain a hold in the intestines of the larvæ at this age, but makes more progress in the tissues of the insect after it has been capped over. The former species is due to the ravages of *bacillus alvei*, and the latter type to *bacillus larvæ*. Both varieties of the pest are known in South Australia; but, so far as investigations have gone, the *bacillus larvæ* type is the most prevalent.

Bees that are weak and ill-cared for present an easy prey to the disease germs. An early symptom is shown by the grubs occupying an abnormal

position in the cell. An unusual restlessness observable in the hive will sometimes lead to the detection of the disease. The larvæ assume a limp, unhealthy appearance, with a yellow tint in place of the customary whiteness of their skin, deepening as the germs multiply, to a color resembling that of coffee. The body diminishes after death by decomposition and evaporation. The decaying mass will stretch slightly in an elastic fashion if an attempt is made to withdraw it from the cell. It eventually dries up, until only a dark-brown scale remains on the lower cell wall. In some instances a glue-like odor is present. Should some of the larvæ escape infection until sealed, the capping will be dark, sunken, with a greasy appearance, and occasionally pierced by an irregularly shaped hole.



Comb Affected with Foul Brood *Bacillus Larvæ*, White.

This type of disease is often found in conjunction with "sour brood," and the germ of the latter disease (*streptococcus apis*) will be found as well as *bacillus alvei*. In such instances the decaying matter will be less elastic, and a sour smell will be present. Bees suffering from sour brood should undergo the same treatment as for foul brood. In the second type of disease the larvæ reach a more mature growth before the disease is much in evidence. The symptoms are easily discernible, the cappings being dark, sunken, greasy looking, and often pierced by a pinhole. Upon opening a cell, the larvæ will be found a decomposing mass, very ropy, having a buff color, and eventually drying to a dark-brown scale, which is difficult to remove. Sometimes on opening a cell only the dried scale will be found. This type of disease

is usually associated with a distinctive odor of glue, which is nearly always in evidence if the disease is of long standing. The odor of foul brood is a somewhat variable quantity, and is probably dependent to some extent upon climatic and atmospheric conditions.

CHILLED BROOD.

Brood often becomes chilled and dies during adverse weather conditions, especially if the hive contains insufficient bees to properly cover the brood nest. Such brood is necessarily foul, but must not be confused with foul brood, which is the generally adopted name of a specific disease. The larvæ in such cases are usually removed by the bees. Their color is a dull grey, afterwards becoming almost black. They can usually be withdrawn from their cells with their structure intact.

SOURCES OF FOUL BROOD INFECTION.

The sources of foul brood infection are—

1. Honey containing the spores of disease.
2. Robbing, by means of which such honey is conveyed from a diseased hive to a healthy one.
3. Feeding bees with honey from diseased hives.
4. Extracting, and returning combs from diseased to healthy hives.
5. Using hives, combs, and appliances which have been in contact with disease without properly disinfecting them.
6. Manipulating from diseased to healthy hives without disinfecting hands and smoker.
7. Using comb foundation made from infected wax which has not been efficiently sterilised.
8. Placing healthy hives on stands previously occupied by diseased hives.
9. Ants are a probable means of disease conveyance from hive to hive.
10. Watering places are also to be considered as likely to become contaminated.

TREATMENT.

The successful treatment of foul brood depends upon the thoroughness of its execution. To "tinker" with the disease is simply to encourage it. To attempt its cure by means of chemicals is usually a waste of time. Measures for disease eradication should be taken prior to a honey flow—preferably at the commencement of the season—so that the bees have a period of plenty before them in which to replenish their hive. Treatment commenced late in the season does not usually give the bees sufficient time to regain their strength before winter. At this period the bees are not inclined to build comb so readily. The tendency to rob is also prevalent at the latter end of the season. Under such circumstances it is advisable to destroy any diseased hives that are weak and unlikely to survive till the following spring. The

others should have their entrances contracted and rendered safe from robbing bees. Treatment is then deferred till the following season.

The treatment which is generally acknowledged to be the best is to remove the bees from their hives and combs, reducing them to practically the condition of a natural swarm. The diseased hive is removed from its stand, and a clean one is put in its place, with a large cloth or piece of paper beneath it. The bees from the diseased hive are brushed, or shaken, from the combs on to the cloth, and allowed to run into the new hive. The latter is fitted with frames having $\frac{1}{2}$ in. starters of comb foundation. The diseased hive and combs are immediately placed where no bees can get to them. The cloth receives any infected droppings, and is gathered up immediately the bees have run in. The ground surrounding the hive should be turned over and dug in.

After three or four days, when the bees have consumed all the honey in their bodies in building comb, they are returned to their old hive, which has, during the interim, been carefully disinfected. This is fitted with wired frames of comb foundation. The small quantity of comb they have built is rendered to wax and sterilised. During the ensuing season a careful watch should be maintained over all hives, to make sure there is no recurrence of the disease. If honey is not coming in freely, the bees should be fed on a syrup composed of sugar and water.

DISINFECTION.

The combs of the diseased hives should have the honey extracted from them, and then melted down and sterilised by prolonged boiling. Such honey is perfectly good for human consumption, but must on no account be fed to bees. The honey extractor should be disinfected after use. It is not advisable to utilise the wax for the making of comb foundation, unless complete sterilisation is assured. The hives and frames should be thoroughly scorched by means of a painter's blow lamp, directing the flame well into the cracks and corners of the hive. If preferred, disinfection can be carried out by well boiling in a strong solution of caustic soda and water. It is advisable to burn the cloths, or quilts, as these are apt to be germ retainers.

Combs containing a fair proportion of healthy larvæ can be placed in the upper storey of a diseased hive, with a queen excluder between the brood box and the storey, to prevent the queen from laying in them. Twenty-one days afterwards all healthy larvæ will have hatched, and the combs can then be removed and rendered down. The hive above which they were placed can then be treated.

MISCELLANEOUS POINTS.

Treatment should not be commenced when there is any likelihood of robbing bees being present.

Too many hives should not be treated at one time, as prolonged disturbance in the apiary will encourage "robbing" and "mixing up."

Early in the season every hive should be carefully examined for signs of foul brood.

Droppings of honey and pieces of comb should not be left about the apiary.

The detection of the disease in its initial stage means an easier cure, and a better chance to completely eradicate it.

RECIPES.

1. Carbolic solution for disinfecting hives and appliances.—Calvert's No. 5 carbolic acid, one part ; water, two parts.

2. Formalin solution for disinfecting hands, &c.—Formalin, one part ; water, 10 parts.

3. Sugar syrup for feeding bees.—Pure cane sugar, 12lbs. ; water, 9pts. ; vinegar, 1oz.

THE FOUL BROOD ACT.

The vital clauses of the Foul Brood Among Bees Act, No. 410 of 1887, are as under :—

1. Every person who shall have in his possession, or under his care, any colony, hive, or swarm of bees affected with foul brood shall forthwith destroy all comb and thoroughly disinfect any box, case, or hive, and any material or thing which shall have been used in connection with bees so infected.

2. Any person who shall, after one week's notice in writing having been served upon him by the inspector or person appointed or authorised under the provisions of the next clause, knowingly fail to observe the foregoing section in any particular, or shall knowingly have on his premises any comb infected with foul brood, shall be guilty of an offence under this Act, punishable on summary conviction by a penalty of not less than five shillings or more than ten pounds.

TO INQUIRERS.

Letters having reference to apicultural matters should be addressed to the Inspector of Apiaries, Department of Agriculture, Adelaide.



POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR SEPTEMBER.

Hatching should be in full swing this month, so that by the middle of October, in the north, and the end of that month in late districts, such as the hills and South-East, all chickens required should have been hatched. Ducklings and turkeys can be hatched until November. Late-hatched chickens do not pay. They are from eggs laid by hens at practically the end of the season, and at a time when the male birds are generally lacking vigour. Late-hatched chickens are handicapped by such a start in life, and rarely make fine well-grown adults. They feather badly and are prone to diseases. The cockerels mature slowly, and are only ready for market when the supply is plentiful. The cost of rearing and fattening late-hatched chickens is much greater than in the case of those hatched early. The pullets do not lay until the spring, as they are not matured until the cold weather; often they have not the stamina necessary for egg-production in severe weather.

Sale of Chickens.—Those who have neglected to hatch the required number of chickens can still purchase chickens from many reliable breeders. The trade in day-old (just hatched) chickens is growing. Day-old chickens can travel with safety on a two days' journey. When a month old or older they cannot stand long journeys so well.

The Demand for Table Chickens and Ducklings will be very good this year. Hatch as many as you can, feed well, and lose no time in getting them ready for an early market. Most breeders keep back their supplies for the Christmas markets until within a week of Christmas Day. This is a great mistake. It was all right in the old days, but cold storage has altered trade methods completely. The trade in dressed poultry has increased enormously, and dealers must buy beforehand in order to accumulate sufficient stocks to meet demands. These stocks are held in cold storage. From November to the middle of December the market is generally active, and prices are good. Time your chickens and ducklings for delivery in prime condition at about this period.

Eggs.—The approach of the general laying season of farm fowls is bringing down the price of eggs. As the warm weather approaches the quality of the

ordinary market egg does not improve. Stale and rotten eggs cause a loss to the State of over £50,000 worth annually. Shut up your male birds and market only infertile eggs, and thus help to avert some of this scandalous loss. Wash the shells of all dirty eggs. It is poor business to sell any unattractive produce. Eggs with dirty shells are not attractive—they are decidedly repulsive. The dirt and manure on the shells of such eggs are swarming with micro-organisms. These may include filth and disease germs, and may endanger human life. Quality in produce is the keynote to success. The French and Danish eggs bring the highest prices on the English markets, because the quality can be depended upon and the shells are always clean. All the eggs from the Government poultry stations forwarded for sale in Adelaide, are infertile—their shells are clean, and they are graded into two sizes. Large eggs realise one penny above market price. These eggs are in great demand. These methods are adopted as profitable business methods. They pay well.

Greenfood.—Do not delay any longer in making provision for a summer supply. Lucerne can be sown now in any district, but the ground must be well prepared, and should be well manured. Lucerne is the best of all green foods for poultry. With good cultivation it will do well on a limited water supply. Silver beet is an excellent summer fodder. In rich soil and with a fair amount of water, a great and continued yield can be obtained from a small area. Maize—90-day, and some of the newer fodder varieties—will give a big yield of excellent green food. It should be sown thickly for successive crops, and cut young. There is no poisonous glucoside, as is sometimes the case with sorghum, which is not so good for poultry. In late districts, and where the rainfall is good, it is not too late to sow rape. Kail plants can still be set out.

Vermin.—With the advent of warm weather the various parasites of poultry (lice, ticks, &c.) will evince increasing activity, and if unchecked will produce swarms of young. The majority of losses among poultry, generally attributed to diseases, are in reality due to the depredations of vermin. Ticks, especially, should be eradicated. Read the article now appearing in this issue of the *Journal* on the poultry tick, and look up the previous numbers. Use kerosine emulsion freely on the poultry houses, after first cleaning out all filth and rubbish. Dispense with any unnecessary woodwork. To 9galls. of boiling soapsuds add 1gall. of kerosine. Churn and mix thoroughly and apply boiling hot—saturate all woodwork and flood cracks. Infested birds may be dipped in the above mixture, at a temperature not exceeding 100 degrees F. Choose a fine day; immerse the bird and thoroughly saturate the plumage; squeeze the feathers dry, and place the birds in a warm coop facing the sun, where they can dry their feathers.

The Chickens must be kept growing. If you do not feed them well, upon nourishing food, you cannot reasonably expect them to become profitable

adults. It is the utmost folly to attempt to rear stock on starvation rations. The science of feeding is a rational one, yet it is strangely disregarded by those who should know. Give as much variety of food as you can. Monotony in the composition of the food rations can only have one result—stagnation and general unthriftiness. The most recent scientific conclusions, founded upon carefully carried out experiments, prove conclusively that no one food contains the necessary constituents for all the functions of life. Feed the young stock on mixed cracked grains, and after they are a month or so old, give at least one meal a day of mash, to which must be added some animal food. Give plenty of cut greenfood, which will supply the mineral salts so very essential. Green fodders vary in their mineral content, both as to quantity and nature; therefore, give as much variety as you can. Provide sharp sand and grit to aid the mechanical processes of digestion.

Ducklings, like chickens, must never receive a check in their growth—they must be kept well fed. Give them variety of food, and remember that animal food is absolutely essential. Of cut green food and grit they can consume astonishing quantities. Market ducklings should be forced on so as to be ready at from eight to ten weeks from the shell. Keep a full supply of clean fresh water at all times, day and night. Thirsty ducklings will die like flies as soon as they have access to water, of which they drink too much. Therefore, never allow them to want for fresh clean water. House them in clean, dry sheds, using plenty of clean straw.

Goslings are generally sent to market in miserably poor condition. True, the goose is a grazing bird, but as a rule round the homestead there are numerous horses, cattle, and poultry, which eat all the available grass, and the young goslings suffer. Feed at least once a day on bran and pollard, or ground wheat. During the last fortnight give them all they can eat and send them down fat to market. Sell to a reliable dealer and it will pay you. Sell goslings, do not sell off your breeding stock—they are tough and not of very fine flavor.

Turkeys should be bred in large fox-proof enclosures. There is a splendid market, and supplies are yearly decreasing. Turkey-breeding should become a most valuable branch of the industry; the profits are great, and the prospects for continued high prices are most encouraging. Market only the well grown, thoroughly fat, young birds, not exceeding six months old. Introduce some American Bronze stock, so that you can grow large birds. Turkeys are sold at per pound—therefore, the large varieties are the most profitable.

Incubators should be scrubbed clean after each hatch, and then should be disinfected with the fumes of burning sulphur. Supply a new wick to the lamp each hatch. Follow the maker's directions for working.

Sitting Hens and Turkeys should be well dusted with a good insect powder. Examine the nest and see that it is also free from vermin. Many losses and disappointments are due to vermin.

Sun Shades should be provided for the stock. They can be made of a permanent or of a temporary nature. Serviceable shades may be constructed of split wheat bags stretched over a low framework and whitewashed. Shelters may be made of straw ; others more lasting may be made of galvanized iron. Iron structures of all sorts should receive two coats of thick whitewash ; this will materially reduce the temperature.

Poultry Houses may be covered with a good layer of straw, held in place by strips of wire netting.

POINTERS.

Don't crowd your chickens and ducklings. Give them room and plenty of fresh air. Keep them out of draughts, but let them have sunlight.

Don't use inferior foods. The so-called fowl's wheat should have no place on a properly conducted poultry farm. Food of proper nature will do good—rubbish contains little or no nutriment.

Don't expect satisfactory egg yields from old hens. The average hen does not lay a profitable number of eggs after the second season.

Don't neglect to keep all yards and houses clean. Disinfect the water vessels, and see that clean, fresh water is always in them.

Don't expect lively, vigorous chickens and ducklings unless your breeding stock is healthy and properly housed and fed.

Don't make the mistake of trying how many breeds and varieties you can accumulate. Remember that the most successful poultry breeders confine their attention to one breed or variety.

Don't buy so-called cheap stock, eggs, or appliances. First-class utility poultry cost more money than do exhibition fowls. From such you can expect definite and uniformly good results. From cheap rubbish you may rely upon inferior and disappointing results.

Don't blame the business because your methods are faulty. House your stock so that cats, &c., do not destroy your season's work. Keep the doors closed at night, and do not trust to luck. One might write a chapter upon this subject.

Don't keep mongrel stock. The advance of knowledge in this 20th century makes this point clear. In utility breeding you start with pure bred stock, and then develop the utility characters until you breed these characters pure. Learn this fact and you will be on the road to success.

Don't fail to write to the Poultry Expert if you are in trouble or require any information.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended Aug. 31st.	Total Eggs Laid from April 1st, 1912, to Aug. 31st, 1912.
SECTION I.—LIGHT BREEDS.		
WHITE LEGHORNS.		
Cowan Bros., Burwood, N.S.W.	134	553
Tabuteau, J. O., Black Rock, Melbourne	115	420
Hodges, H., Pyalong, Victoria	129	397
The Range Poultry Farm, Toowoomba, Queensland	133	441
Brundett, S., Moonee Ponds, Victoria	139	438
Jessup, W. C., Caulfield, Victoria	107	410
Dawes, J. H., Granville, Sydney	129	520
Beadnall Bros., Gawler	132	538
Redfern Poultry Farm, Caulfield, Victoria	125	304
Kerr, R., Longwood, S.A.	141	506
Eckermann, W. P., Eudunda	141	456
McNab, J. A., Sandringham, Victoria	131	416
Mazey, P., Alberton	84	316
Broderick, P. J., Gawler	121	379
Redfern Poultry Farm, Caulfield, Victoria	86	356
Braund, J. E. and H. J., Islington	124	331
Dunn, L. F., Keswick	98	381
Hocking, E. D., Kadina	124	382
Groom, E., Peterhead	116	400
Pope, R. W., Heidelberg, Victoria	138	497
Haines, T. F., Fullarton Estate	130	307
Provis, W., Eudunda	116	365
Burton, W. S., Moonta Mines	92	354
Broster, G., Mallala	124	359
Brain, J. H., South Yan Yean, Victoria	112	391
Sargenfri Poultry Yards, East Payneham	144	514
McKenzie, H., Northcote, Victoria	131	453
McDonnell, J., Greytown, Rosewater	125	472
Browne, A. R., Hawke's Bay, N.Z.	130	486
Brain, J. H., South Yan Yean, Victoria	103	307
Marsson, C., Welland	98	259
Hutton, C., Parkside	112	367
Miels, C. & H., Littlehampton	116	326
Moritz Bros., Kalangadoo	125	448
Codling H., Mitcham Park	85	274
Troughbridge Poultry Yards, Edithburg, Y.P.	102	354
Irvine, A. W., Epsom, Auckland, N.Z.	116	388
Walker, P., Hicksborough, Victoria	105	370
Lampe, B., Kadina	104	223
Waite, F. J. O., Nailsworth	123	465

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Aug. 31st.	Total Eggs Laid from April 1st, 1912, to Aug. 31st, 1912.
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SECTION I.—LIGHT BREEDS—*Continued.*

WHITE LEGHORNS.

Badcock, G., Mile End	113	295
McClelland, A., Mordialloc, Victoria	76	281
Tomlinson, W., Clarence Park	123	366
Roberts, L. L., Kadina	123	336
"Strathcona," Long Plain	130	339
Whitegate Poultry Farm, Deepdene, Victoria	104	389
Purvis, Miss Gracie, Glanville	104	395
Padman, A. H., Hyde Park	102	427
Sickert, P., Clarence Park	123	409
Purvis, W., Glanville	138	416
Rice, J. E., Cottonville	131	499
Hamill, H., Kogarah Bay, Sydney	112	322
Gurr, W. E., Kapunda	135	390
McLeish, E., North Adelaide	139	339
Craig Bros., Hackney	134	418
Uren, Mrs. P. A., Kapunda	140	623
Perry, Wm., Murrumbidgee, Victoria ..	56	302
Nancarrow, J. T., Port Adelaide	120	319
Bertelsmeier, C. B., Clare	121	425
Tockington Park Poultry Farm, Grange	106	454
Trenwith, T. H., Kadina	110	262
Knappstein & Bray, Clare	113	262
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	111	350
"Deneshollow," Caulfield, Victoria	88	335
Hill, Chas., Monarto South	92	240
"Islay," East Malvern, Victoria	104	308
Cosh, A. J., Burnside	130	431
Indra Poultry Farm, Freeling	135	330
Whitrow, A. J., Knoxville	131	421
Hall, T. C., Rose Park	118	442
Ontario Poultry Farm, Clarendon	104	367
Howlett, H., Moonta	125	335
"Koonoowarra," Enfield	99	486
Hall, A. W., South Oakleigh, Victoria	139	462
Convent of the Good Shepherd, Oakleigh, Victoria	104	297
Carne, E. A., Kangaroo Flat, Victoria	111	366
Navan Poultry Farm, Minlaton	99	282
Lillywhite, R. G., Fullarton	125	393
Gibbs & Pine, Queenstown	80	199
Hughes, J. J., Elsternwick, Victoria	107	257
Shamrock Poultry Farm, Perth, W.A.	112	302
Bertelsmeier, C. B., Clare	124	326
Nancarrow, J. T., Port Adelaide	93	350

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Robertson, F. H., Northam, W.A.	101	263
McKenzie, E., Northcote, Victoria	84	267
Mitchell, B., Bendigo, Victoria	87	240
Provis, W., Eudunda	116	280
Kenway, D., West Pennant Hills, Sydney	110	393
Cowan Bros., Burwood, N.S.W.	79	388
Kenmore Poultry Farm, Dandenong, Victoria	127	209
Brundett, S., Moonee Ponds, Victoria	114	293
Cant, E. V., Richmond	116	303

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Aug. 31st.	Total Eggs Laid from April 1st, 1912, to Aug. 31st, 1912.
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SECTION II.—HEAVY BREEDS—*Continued.*BLACK ORPINGTONS—*Continued.*

Craig, Mrs. C., Hackney	126	284
Lampe, B., Kadina	102	267
Wirraparinga Poultry Yards, Plympton	75	253
Phillips, A., Portland, S.A.	97	211
Martin, B. P., Unley Park	125	401
Nancarrow, J. T., Port Adelaide	57	162
Padman, J. E., Plympton	82	355
Francis Bros., Fullarton	89	191
Hall, T. C., Rose Park	97	343
Tockington Park Poultry Farm, Grange	128	266
Bertelsmeier C. B., Clare	107	334
Craig Bros., Hackney	104	381
Bertelsmeier, C. B., Clare	103	281

SILVER WYANDOTTES.

Dunn, L. F., Keswick	118	402
Tidswell, H. J., Mitcham Park	79	401
Moyas, S., Blyth	122	287
Perry, Wm., Murrumbidgee, Victoria	112	260
"Denehollow," Caulfield, Victoria	102	329
Western, F. C., Marion	106	443

SALMON FAVEROLLES.

Courtenay, K., Mordialloc, Victoria	114	371
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LANGSHANS.

Stevens, E. F., Littlehampton	108	362
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PLYMOUTH ROCKS.

"Koonoowarra," Enfield	120	216
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SECTION III.—SCRATCHING SHED SECTION.

WHITE LEGHORNS.

Sickert, P., Clarence Park	128	430
Tomlinson, W., Clarence Park	138	500
Moritz Bros., Kalangadoo	109	339
Codling, H., Mitcham Park	117	347
Sargenfri Poultry Yards, East Payneham	134	374
Purvis, W., Glanville	98	360
Bertelsmeier, C. B., Clare	123	401
Padman, A. H., Hyde Park	130	471
Hocking, E. D., Kadina	122	318
Beadnall Bros., Gawler	118	303
Brain, J. H., South Yan Yean, Victoria	99	234
Provis, W., Eudunda	111	378
Redfern Poultry Farm, Caulfield, Victoria	130	430
Broderick, P. J., Gawler	123	293
"Koonoowarra," Enfield	126	275
Lillywhite, R. G., Fullarton	128	332
Cosh, A. J., Burnside	109	328
Indra Poultry Farm, Freeling	132	336
Whitrow, A. J., Knoxville	127	332
Tockington Park Poultry Farm, Grange	128	391

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended Aug. 31st, 1912.	Total Eggs Laid from April 1st, 1912, to Aug. 31st, 1912.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	133	503
Dow, A., Glencoe West	133	519
McNamara, Mrs., Mount Gambier	96	371
Moritz Bros., Kalangadoo	140	607
"Mahama," Mount Gambier	129	452
Holmes, F. A., Frances	121	476
Sudholz, A., Kalangadoo	109	369
Staunton, S., Naracoorte	91	337
Hall, C. W., Mount Gambier	126	439
Moritz Bros., Kalangadoo	130	519
Vorwerk, K. E., Millicent	133	447
Vorwerk, H. F. & A. C., Millicent	115	449
Jarrad, J., Mount Gambier	119	390
Bartram, T. A., Kybybolite	130	529
Vorwerk, H. F. & A. C., Millicent	69	366
Jenkins, R. D., Kybybolite	122	308
Arthur, J. S., Bordertown	102	417
Drake, C., Naracoorte	58	382
"Eurinima," Kybybolite	127	483
Smith, M., Hynam	54	354
Lacey, F. C., Kybybolite	139	632
"Herdfield," Mount Gambier	98	530
Blue Lake Poultry Farm, Mount Gambier	107	351
Beaton, W. J., Tantanoola	116	408
Bennett, E., Kalangadoo	114	289
Jones, H. F., Mount Gambier	119	327

MINORCAS.

James, S. T., Mount Gambier	70	167
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdfield," Mount Gambier	131	354
Blue Lake Poultry Farm, Mount Gambier	67	283
McNamara, Mrs., Mount Gambier	46	170

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	81	319
Osborne, W. F., Kalangadoo	81	349

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	73	88
Glenelg River Poultry Farm, Mount Gambier	49	155

NOTES ON EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

The more favorable weather recently experienced has resulted in all-round general improvement and consistent laying. The eggs were weighed on July 31st, in conformity with the regulations. A number of pens failed to reach the required weight of 24ozs. to the dozen, and are, therefore, debarred from competing for a prize.

The pens which failed are as follows :—

Roseworthy.—Section I.—Pens 10, 37, 42, 50 ; Section II.—Pens 85, 86, 89, 90, 94, 97, 98, 105 ; Section III.—Pens 4 and 8.

Kybybolite.—Section I.—All reached the required weight Section II.—Pen 33 failed.

Space does not admit of further dissection of the results. I may state, however, that an analysis of last year's results in Section I. show that it is a mistake to think that hens laying small eggs lay more than those laying fairly large eggs.

ROSEWORTHY.

The Superintendent reports :—The general health of the birds was good. During the month one bird had a mild attack of chicken pox and one an attack of roup ; both birds are isolated and under treatment ; they will be restored to their respective pens in a day or two. Two deaths occurred during the month, one White Leghorn in Section I., also the bird which was sent to replace same. The upward tendency in the laying is most gratifying, as it has been most consistent and places the averages, both individual and per pen, well above those up to and including the same period last year. With the advent of a few warm days the heavy breeds kept up their reputation for broodiness ; 23 have paid a visit to the pens set apart for that purpose. Section I. also contributed two hens to the broody pens. The weekly scores will show that moulting has finished ; this is a pleasing feature, as the moult has been of a very extended character this year. The scores for the month will approximate 15,000 eggs, compared with 10,000 for the month of July. Apart from the improving weekly averages for each pen, the feature of the laying has been the consistent good work put in by the leading pen, which is going strong for a new record, provided they can hold out. The weather during the month has been of a mild character. The average maximum was 64·9, the highest reading 75·6 ; the average minimum 39·38, the lowest reading 28·1. We have had almost a daily visitation of wind, which was chiefly from the south-west. Rain fell on eight days ; points registered, from 1 to 164, total registration 2·51.

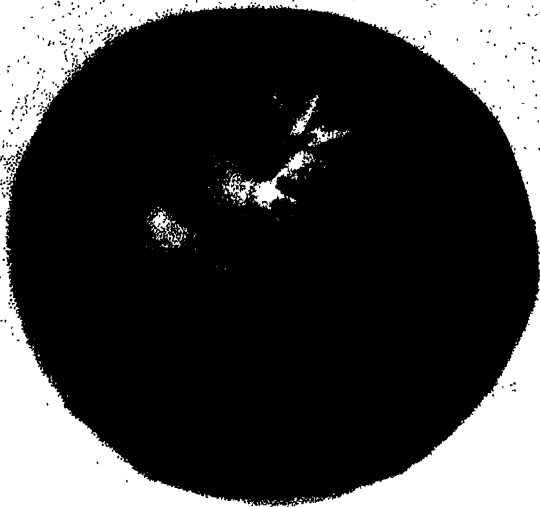
KYBYBOLITE.

The Superintendent reports :—The general health of the birds has been good, no deaths nor any cases of sickness occurring. Two birds in Section II. had to be removed from their pens owing to broodiness. The laying during the latter part of the month has shown marked improvement on last month, although wind was registered on 20 days. Several pens were shut up and did not lay for a few days during the month, but they have now commenced and are doing good work. The leading pen is laying consistently and will take a lot of catching, unless something unforeseen happens. The minimum temperature was 29°, and the maximum of 67°.

1913-14 LAYING COMPETITIONS.

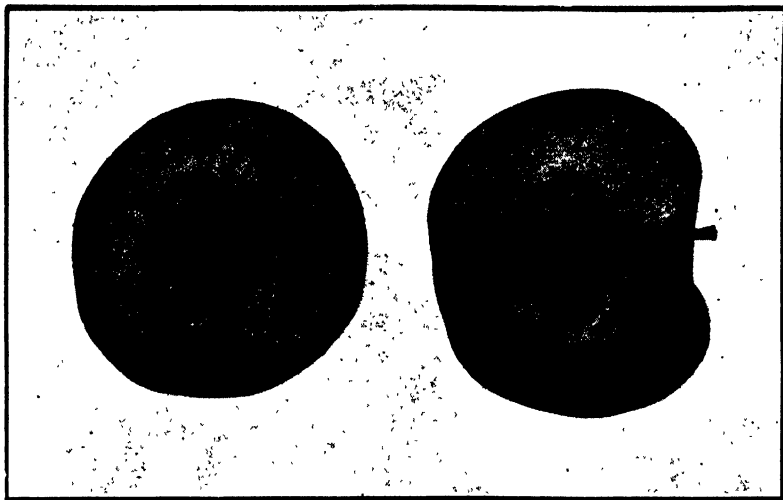
The Hon. Minister of Agriculture has authorised tests to begin on April 1st, 1913, at the poultry stations, Roseworthy and Kybybolite. There will be three sections in each test, and prizes of £10, £5, £3, £2, £1 in each section ; total prize-money £126. The sections are—Section I., light breeds ; Section II., heavy breeds ; Section III., any breed. The latter section is confined to persons engaged in pastoral, farming, market gardening, and fruit-growing pursuits, who reside on land they occupy as tenants or as freeholders. Further particulars may be had on application.

D. F. LAURIE, Poultry Expert and Lecturer.



JONATHAN APPLE.

A. Vaughan, Govt. Photolitho



APPLE—JONATHAN.

FRUIT.

Size—Medium, fair samples averaging 2½ in. long by 2½ in. wide. *Shape*—Slightly and evenly conical. *Color of skin*—Much covered with bright red, sometimes splashed and streaked with darker red, otherwise rich bright golden yellow, the whole surface strewn with small indistinct russet dots. *Eye*—Closed, with sepals short and slightly flat convergent, set in a basin of moderate depth, narrow, regular, and slightly ribbed on the sides. This cavity is usually lightly stained with red, but when grown in shade is clear yellow. *Stamens*—Median position in funnel-shaped tube. *Stalk*—About ¾ in. long, slender, and clubbed at outer end. It is inserted in a round, even, fairly deep cone-shaped basin, which is usually lined with smooth brown russet, which passes off into irregular russet streaks as it ascends up the walls of the basin. *Flesh*—Pale yellow, moderately tender and juicy, possessing a sweet, spicy flavor. *Seed Cells*—Obovate, axile, very symmetrical.

TREE.

Habit—Erect when young, but, owing to the shoots being slender the tree becomes willowy and spreading or rounded after fruiting begins. The lateral shoots are long, divergent, slender, and downy, causing the bark to assume a peculiarly distinct greyish tint, with sparsely scattered round dots. The buds near the base of the lateral are not well developed. If left unpruned the buds on these laterals spur well and soon bear fruit. The leaders should be pruned fairly hard for several years after planting to keep the tree erect, but the laterals merely spaced and left unpruned until after they have fruited. Tree not very subject to fungus diseases. *Climatic and soil conditions*—Thrives and yields best flavored fruits in cool localities and fairly rich, damp soils, such as are found in Mount Lofty Ranges and the South-East, and to a lesser degree in Barossa and Wirrabara Ranges of South Australia. *Value*—Probably the best apple for export trade and local consumption in its season. It is not very liable to “bitter pit,” but in cold storage develops a dark skin spot. It is ready for shipping in March; local season April-June. *Origin*—Kingston, New York, U.S.A., named after Jonathan Hasbrouck, who first brought it into notice.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, August 14th, there being present Mr. A. M. Dawkins (Chairman), Col. Rowell, Messrs. C. J. Valentine, C. J. Tuckwell, C. E. Birks, G. F. Cleland, J. Miller, F. Coleman, and G. R. Laffer, Professor Lowrie, Professor Perkins, and G. G. Nicholls (Secretary).

RAILWAY ADVICE NOTICES.

The Secretary reported that the Railways Commissioner had sent to the various stationmasters a circular intimating that consignees could arrange with them where telegraphic communication existed to forward collect telegrams notifying the arrival of goods. If telegraphic advice should not be asked for, the usual advice note must be posted immediately upon the arrival of the goods.

WILD DOG SCALPS.

A request was received from the Hookina Branch that the opinion of other Branches might be obtained regarding a proposal to impose a tax of 1s. a square mile on land outside vermin-fenced areas, and 6d. a square mile on that inside, for the purpose of raising funds to pay for the scalps of wild dogs. It was decided to accede to the request.

EXPERIMENTAL ORCHARD.

Professor Lowrie suggested that, if possible, arrangements should be made to enable the delegates to the Congress to inspect the experimental orchard at Coromandel Valley, which, while it was probably the best bit of work of the kind in Australia, was scarcely known. The orchard was well laid out, and its value to the State would increase with each succeeding year. Numerous exceedingly useful experiments were being conducted, and he was confident the results recorded would be of the utmost help to the fruit industry. It was worthy of note that practically all, if not all, the tests proposed by Mr. McAlpine in connection with his investigations into bitter pit in apples were comprehended in the experiments before Mr. McAlpine's plans were made known. That he regarded as a high compliment to the man who had been responsible for the scheme laid down and in course of evolution. The Board agreed to recommend the Minister of Agriculture to make the requisite arrangements for members of the Congress to visit the orchard. It was also decided that the Board should pay a visit of inspection later in the season.

TAINT OF WEEDS IN MILK.

Mr. Tuckwell said that it was well known to dairymen that the taint in milk produced through the cows eating weeds could be almost entirely eliminated by dissolving in hot water in the milk pail (using the smallest quantity of water possible) as much saltpetre as would go on a threepenny bit, and then milking into the pail. There were two kinds of saltpetre, however, viz., nitrate of potash and nitrate of soda. The former was the proper one to use. It was easy to distinguish between the two, as nitrate of potash, when placed on live coals, produced a violet flame, whereas nitrate of soda gave forth a yellow flame.

LOUSY SHEEP.

Mr. C. E. Birks said that it was generally considered in his district that lice in sheep had been introduced through the medium of Shropshire rams purchased at the Adelaide sales. The matter had been discussed by the Port Pirie Branch of the Bureau, which had determined to strongly urge upon the authorities the necessity for stringent measures being taken to prevent the spread of lice in the manner indicated. At present dozens of rams were losing their wool. The Branch thought that something should be done to compel the owners to dip their rams before they were offered for sale. Mr. Valentine pointed out that that could be done now if the sheep were discovered to be infested with lice. Professor Lowrie thought that would affect the sales, as no man would like to dip his sheep within a month before the sale. In New Zealand there were public dips at the saleyards, and an inspector examined all store sheep. When animals were found to be infested the auctioneer declared prior to offering them that they must be dipped before they left the yards. It was decided that Professor Lowrie, Messrs. T. H. Williams (Chief Inspector of Stock), Birks, and Valentine should go into the question, and take whatever action might be deemed advisable.

SOUTH AUSTRALIAN FLOUR.

Attention was directed to the bread-making qualities of South Australian flour by Mr. Coleman, who displayed a quantity of compact and attractive loaves of bread made by an Adelaide baker from South Australian flour. Mr. Coleman explained that when the members of a leading firm of English confectioners were in Sydney some time ago they poo-pooed the idea that Australian straight flour could make a good bread, and contended that to obtain the best results it would have to be blended with flour from elsewhere. Mr. Coleman said that the baker referred to urged that something should be done in the direction of establishing a school of bakery in South Australia. It was decided to ask the Minister to direct the attention of the Trade Commissioner to the fact that some prejudice existed in regard to South Australian flour in England for baking unblended, so that some steps might be taken to demonstrate the excellence of the loaf made from it.

IMPORT DUTY ON FERTILISERS.

Mr. Coleman said the Saddleworth Branch of the Bureau had recently resolved to vigorously oppose the proposed duty on imported superphosphate. He hoped that the Government would take effective action in that direction. The farmers were not so favorably situated in respect to duties as those engaged in most other industries, in that they could not pass them on. The Secretary said the subject had already been brought under the notice of the Minister, who had taken action at the Conference of Ministers in Sydney recently.

EXPORT OF FRUIT.

Professor Lowrie stated that he had received the following letter from the Under Secretary for Agriculture in New South Wales :—" With reference to the resolution passed at the Conference of Ministers of Agriculture in Sydney, to the effect that the shipping companies be urged to provide separate chambers for the particular quality of fruit that might be shipped from each Australian port, and that, after stowage, such chamber be kept closed from the commencement to the end of the voyage, I have to inform you that such resolution has been placed before the principal oversea companies, and their replies indicate that, while the advantages contained in the suggestion are recognised, and their past endeavors have been to give effect to it so far as possible, they are unable to comply wholly with the request. If, however, each State will guarantee to fill each chamber set apart, or pay for any space which may be left vacant, the request will be reconsidered." This communication had been forwarded to the Government Horticultural Expert (Mr. G. Quinn), who had reported :—

" I am of the opinion that the attitude assumed by the shipping companies in respect to the allotment and filling of the insulated space in their ships is the only one that could possibly be taken up in respect to the resolution placed before them. I take it the object sought in such a resolution is to prevent fluctuations of temperature in any cool chamber after the first fruit is placed in it and the air has been brought down to the degree considered to be necessary to the preservation of the fruit. There appear to be difficulties in providing in each ship chambers for the respective States which shall have a capacity equal to that number of cases the shippers are able to supply at the port of call of each such State. If the export trade throughout the Commonwealth were thoroughly organised, these difficulties might disappear, and the proposal come rapidly within the range of adoption into practice. That desirable state of affairs, however, does not exist, and is not likely to eventuate for some time to come. It would be a step in the direction of achieving the object sought in the resolution if all fruit were cooled down before being taken into chambers. It is only reasonable to assume that, on the score of economy in working their refrigerating machinery alone, the shipping companies have so far as practicable completely filled the chambers as they

proceeded with the loading from port to port. Even if the freights were the same for the space from the last port as from the first, I can see no reason for a different action on their part.

"If the shipping companies insisted on all fruit being cooled prior to being received on board the fluctuations of the temperatures in the holds would be minimised, as well as a saving made of the energy now imposed upon the ship's refrigerating machinery. This pre-cooling might involve some hardship to the shippers at first, until the system became established; but I am of the opinion that the efforts to bring the fruit to the wharf a couple of days earlier, and the cost of the cooling, would be amply repaid in the general security vouchsafed to the whole cargo of fruit through its operation. Fruit now travels at times to the ship's side on trucks, or on other vehicles, through air temperatures varying from 90° to 100° F. in the shade, and at the time of going aboard the contents of many of the cases must retain degrees of heat closely approximating to these figures, with results disastrous alike to that and to the fruit previously stored therein. It was largely with a view to securing the elimination of its latent heat before stowage took place that I have strenuously sought to insist on fruit being at least 24 hours at the appointed places for examination under the Commerce Act, and secured as 'appointed places' premises where proper accommodation for cooling the fruit existed. The shippers, however, have all along resisted this object, mainly because a charge of 2d. per case has been made for this service—although, if they desired it, storage for a week, which is more than ample time to cool down their produce, has been offered for this amount. It is all very well to ask the shipping companies to adopt additional precautions to safeguard the carriage of fruit, but the shippers must also do their share in assisting to secure their produce against depreciation. Up to the present they have not possessed themselves of the advantages which are made available to them, in this State at any rate, of bringing their fruit to the ship's side in a condition which all authorities on refrigeration consider essential to achieving the most successful storage. In regard to the resolution, I respectfully advance the opinion that, as the States appear to be no longer empowered to impose restrictions over exports, the Commonwealth Government might be approached with a view to making pre-cooling of fresh fruit for at least 48 hours prior to its being exported a compulsory rule. There may be, and doubtless is, some laxity of precaution on the part of the shipping companies, but I am in a position to assert that the shippers have not done all that they could to help in making it possible for their fruit to be carried in the best condition."

Professor Lowrie said he had brought the two communications under the notice of the Board because the matter dealt with was one about which he knew very little, and it had occurred to him that the Minister of Agriculture would be grateful for any informative opinions which members might

have to put forward. Mr. G. R. Laffer fully agreed with Mr. Quinn that it was unreasonable to expect the shipping companies to do everything, when the shippers neglected the very things in which they might help them. Twelve months ago a very large proportion of the fruit sent from South Australia had not the slightest chance of reaching its destination in good order, for the reason that it was put into the chambers at Port Adelaide in almost a red-hot condition. Col. Rowell considered that the great fault was in the management of the refrigerators on the steamers. Some time ago he sent to England two lots of similar fruit (which had been pre-cooled) by different steamers. One consignment arrived in excellent condition; the other was wasted and yellow. Mr. Laffer largely blamed the Produce Department and the Chief Inspector. He had seen at the Port Adelaide Depot fruit placed in such a position that it was bound to be detrimentally affected. He had always paid for cool storage here, but when the State authorities repudiated all responsibility in regard to the fruit placed in the department's cool chambers, how could they ask the shipping companies to put tell-tale thermometers in their holds? Mr. Quinn was quite right relatively to the necessity for pre-cooling, and there was no doubt that if stuff was put into a hold in a heated state it must have a prejudicial effect upon the fruit already there. He contended that in the case of fruit to be held at the Depot for a week, the management should be empowered to put it into the cool stores. Col. Rowell pointed out that during the season just closed one line of steamers had not landed a single case of bad fruit, and all of this had passed through the Depot. Mr. Laffer said the Government had created a monopoly so far as cool storage was concerned, and it was a disgrace therefore that it declined to hold itself responsible for maintaining the temperature at a proper standard. After further discussion, it was decided that Professor Lowrie, Col. Rowell, and Mr. Laffer should inquire into the whole matter, and present a report and recommendation at the next meeting of the Board.

LIFE MEMBERS.

A number of names of members of the Bureau were submitted for approval by the Board as life members, and the following gentlemen were duly approved:—Carrieton—J. W. Bock; Mount Pleasant—W. Lyddon; Minlaton—S. Vanstone; Arthurton—T. H. Hawke, T. B. Wicks; Strathalbyn—M. Rankine, J.P., J. Cheriton; Redhill—D. Steele, F. Wheaton; Stockport—J. Smith, D. G. Stribling, J. Murray; Wilmington—W. Slee, A. H. Noll, R. G. S. Payne.

NEW BRANCH AT CLANFIELD.

The formation of a Branch at Clanfield was approved, with the following gentlemen as members:—Messrs. E. A. Pavy, E. H. Milne, D. A. Orwell, W. Paul, A. Clutterbuck, D. A. Orwell, jun., P. Nelson, J. Nelson, W. G. Cowley, G. F. Heaven, A. E. Heaven, A. Richards, L. Gilbertson, G. Watson, F. Franklin, W. Queale.

NEW MEMBERS.

Maitland—E. A. Smith ; Mount Barker—F. von Doussa, G. Milne, R. Hollamby ; Yabmana—B. Howell, H. Schuman, F. Schermiers ; Shannon—H. Roediger ; Coorabie—G. A. Stott, C. J. Wheadon, H. Coppins ; Parilla Well—R. Filby, F. Nordhaussen, A. Nordhaussen ; Clare—W. J. Maynard, S. Pascoc, F. J. Knappstein, R. Hunter ; Monteith—J. Fletcher, W. J. McCulloch, G. Fraser ; Mount Remarkable—W. Smith, jun., E. M. Willington, E. B. Andrews ; Coonalpyn—J. J. Cronin ; Crystal Brook—C. H. Seidel ; Elbow Hill—C. G. Jacobs ; Miltalie—C. E. Searle, R. J. Searle ; Mallala—H. Jury, E. Penfold ; Longwood—H. Winter ; Mount Bryan—G. L. Nut ; Wirrega—H. G. Stevens ; Coomooroo—A. H. Cooke ; Butler—R. T. Harrowfield ; Parrakie—A. S. Johncock, T. Willis, M. J. Cooney, T. Lewis, J. A. Ferme, S. R. Good, A. G. Heinzel ; Penola—T. Yeates ; Mount Barker—C. Alexander, F. Adams ; Gladstone—H. Reynolds, J. Page ; Lyndoch—G. W. Warren ; Freeling—C. H. Schultz, J. H. Gramp, J. Kuhlmann, A. Elix ; Mount Bryan—E. Thomas ; Yadnarie—B. B. Crosby, A. A. Edwards, S. H. Pearce ; Narrung—G. R. Goode, F. E. McNicol, T. E. Barker ; Moorlands—W. Maishman ; Georgetown—C. Read ; Angaston—F. Pearson ; Pinnaroo—G. Fuller, M. Beckwith ; Minlaton—S. F. Hoyle, A. Washington, D. McKenzie, H. A. Chester, A. D. McKenzie, P. W. Griffiths, J. Williams, H. Mumford ; Hooper—J. Boyce ; Burra—E. B. Merkel, A. Brown, J. Wise, S. Burns ; Dowlingville—W. Whittaker ; Coonalpyn—M. S. C. Good ; Mount Gambier—R. Fowler, P. Krummell ; Morgan—O. Hausler, E. Gilgen ; Kybybolite—A. H. Bradley, jun. ; Crystal Brook—A. McDonald, J. H. Shearer, H. Growden ; Hooper—R. J. Chenoweth, B. Chenoweth ; Stockport—E. Weckert ; Maitland—R. Bowey, A. Bentley ; Woodside—G. J. Sampson ; Clare—G. Gerteau, H. A. Hanna, R. Stuart, E. Nancarrow.



THE WHEAT MARKET.

During the greater part of last month the wheat market was dull and inactive. The extensive damage to the English crops through excessive moisture, and less favorable reports received from other countries, however, caused the London market to firm, a result which was at once reflected locally.

Commenting on the wheat position, *Beerbohm's Evening Corn Trade List* of August 2nd states :—"Shipments last week were only moderate, but the proportion destined for the United Kingdom was again very large, and the quantity now actually afloat, added to only small exports from the United States and Canada during the next two weeks, ensure ample supplies for the next four or five weeks, so far as the United Kingdom is concerned. For the Continent, however, the afloat figures have been rapidly decreasing, and it is therefore all the more necessary that there should be a speedy change to fine weather, so that native wheat may be available.

"Latest crop reports from France are less favorable, although it is still generally believed that the yield will be equal to that of 1911, but with the quality inferior to last year's, and as reserves of old wheat are very small, an import of 3,000,000 quarters to 4,000,000 quarters of foreign wheat will be necessary, the greater portion of which will probably be bought in the latter part of the season. There is not much change to note in crop prospects so far as other importing countries are concerned, excepting that the Hungarian crop is now estimated at nearly 1,000,000 quarters smaller than last year. From Russia the latest advices are favorable, and a yield above the average is expected in the greater part of the country.

"The weather in America and Canada during July has, on the whole, been very favorable for spring wheat, and instead of the condition deteriorating considerably in the United States, as was the case last year, prospects at the present time are reported to be distinctly better than a month ago. Some reports of black rust have been cabled over this week, but, judging from the course of the American option markets, little importance has been attached to same. What is now wanted is three or four weeks of fine warm weather to bring the crops to maturity, and to ensure good quality ; if such should prove to be the case America may be in a position to export much more wheat in the season just commenced than was expected a month or so ago. The *Cincinnati Price Current* now estimates the probable yield at about 700,000,000 bushels, or 70,000,000bush. more than indicated by the July Bureau report, and 80,000,000bush. larger than last year's final official figure, but which estimate is believed to have been too small. The winter wheat harvest was distinctly later than last year, especially in those States which have the largest yields, so that shipments in quantity, in all probability, will also be later. In August last year the United States shipped quite freely. Fair quantities of American winter wheat have been sold to Liverpool and also to the Continent."

Date.	LONDON(Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
August 5	—	3/11	4/1½ to 4/2	4/1½ to 4/2
6	—	Do.	Do.	Do.
7	Firm, but quiet; Liverpool firmly held, but inactive	Do.	4/1 to 4/1½	4/1 to 4/1½
8	Steady, no quotation; Liverpool steady; Australian off coast, sellers, 5/0½	Do.	4/1½	4/1½
9	Held for 6d. advance; Liverpool firm; Australian off coast sold at 5/-	Do.	Do.	Do.
10	Steady, but quiet	Do.	Do.	Do.
11	—	Do.	Do.	Do.
12	Dull; Liverpool quiet; Australian off coast, sellers 5/0½	Do.	4/2	4/2
13	Weak; Liverpool very dull and lower to sell	Do.	Do.	Do.
14	Steady, but quiet	3/11 to 4/-	Do.	Do.
15	Steady, but quiet	Do.	Do.	Do.
16	Dull, easier tendency; Liverpool steady, but quiet	4/-	Do.	4/2 to 4/2½
17	—	Do.	Do.	Do.
18	Steady, but quiet	Do.	4/2½	Do.
19	Dull; Liverpool firmly held at full rates, but inactive	Do.	Do.	Do.
20	Steady, no quotation; Liverpool firm, quiet; Australian off coast, buyers 4/10½	Do.	Do.	Do.
21	Steady, but quiet	Do.	Do.	Do.
22	Firmer, with improved demand	Do.	Do.	Do.
23	—	Do.	Do.	Do.
24	Very firm; Liverpool firmly held, but inactive	Do.	4/2½ to 4/3	4/2½ to 4/3
25	Quiet; Liverpool steadily held, inactive	Do.	Do.	Do.
26	Firm and more inquiry; Liverpool firm, but quiet; Australian to arrive, 5/-	4/- to 4/1	Do.	Do.
27	—	Do.	Do.	Do.
28	Firm, but quiet	Do.	Do.	Do.
29	—	Do.	Do.	Do.
30	—	Do.	Do.	Do.
31	—	4/1	Do.	Do.

STEAMER FREIGHTS.—(September 1st)—Steamers from South Australia to United Kingdom-Continent, full cargo rates, old wheat, 28s. 9d. per ton (9½d. per bush.); new crop, 33s. per ton (10½d. per bush.). Parcels, Port Adelaide to London, Liverpool or Continent, 17s. 6d. per ton (5½d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SALTEE FREIGHTS.—From South Australia to United Kingdom-Continent (Dec.-Jan.), 31s. 3d. per ton (10d. per bush.); old wheat, 28s. 9d. per ton (9½d. per bush.); to South Africa (Sept.-Oct.), 22s. 6d. per ton (7½d. per bush.); new season, 25s. per ton (8d. per bush.).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on August 31st :—
BUTTER.

It is satisfactory to note that the supply of cream is increasing steadily, and is of good quality. Butter is in great demand, but prices are much lower than at the end of last month. Present quotations are :—Superfine, 1s. 3d. per pound ; pure creamery, 1s. 2d. per pound.

A. W. Sandford & Co., Limited, report on September 1st :—

BUTTER.—Further fine rains have been experienced in most districts, with specially useful falls over the northern agricultural areas. Quantities of cream and butter have, therefore, further increased, and values, as anticipated, have eased. Best factory and creamery butter, fresh in prints, sold at from 1s. 1½d. to 1s. 3d. per pound ; choice separators and dairies, 1s. 0½d. to 1s. 1½d. ; store and collectors', 10½d. to 11½d.

EGGS.—The forwardings showed a substantial improvement, and in consequence the seasonable lowering in price occurred. Owing, however, to the oversea orders now coming on to this market, coupled with extensive local trade, rates have steadied to 9½d. per dozen.

CHEESE.—The month's turnover has been large and fair prices have ruled, though, with lower quotations from the eastern States, values are not as high as they were. Quotations—New make, for large to loaf, 7½d. to 8d. per pound ; matured, up to 10½d.

BACON AND HAMS.—Considerably higher prices were experienced during August, following on the firming that was recorded at the end of July. Best factory cured sides brought 10d. to 10½d. per pound ; hams 11d. to 11½d.

HONEY.—As it is late in the season very few lots of quality have come along. Prime clear extracted brought 3½d. ; second grades, 2d. to 2½d. ; beeswax is very saleable at 1s. 2d.

ALMONDS.—Values throughout the month have been stationary, and, as it is between seasons, there are only odd lots being forwarded. Brandis, 5½d. ; mixed soft-shell, 5d. ; kernels, 1s. 2½d.

LIVE POULTRY.—The catalogues for August have been heavy, but owing to active local demand, combined with oversea buyers operating, very satisfactory rates have ruled. Good table roosters realised from 3s. 6d. to 3s. 10d. each ; plump cockerels, 2s. 6d. to 3s. ; hens and light cockerels, 2s. to 2s. 6d. ; ducks, 2s. 6d. to 3s. 6d. ; geese, 4s. to 5s. ; pigeons, 8d. ; turkeys, from 7½d. to 10½d. per pound live weight for fair to prime table sorts.

CARCASS MEAT.—Very high figures have been ruling, the supply being not nearly equal to demand, so that buyers bid keenly for all submitted. Bright handy size shop porkers brought from 6d. to 7d. per pound ; good baconers, 5½d. to 6½d. ; heavy and poor stuff, 2d. to 3d. ; nice dairy veal, 3d. to 4d. ; fair quality, 1½d. to 2½d.

POTATOES AND ONIONS.—The market throughout the Commonwealth for both potatoes and onions has been bare, and values have in consequence risen to a figure that has somewhat checked consumption. Present quotations are—Potatoes, £10 10s. to £11 per ton on trucks, Gambier ; onions, £19 to £20 per ton on trucks Gambier.

RAINFALL TABLE.

The following table shows the rainfall for August, 1912, at the undermentioned stations, also the average total rainfall for the first eight months in the year, and the total for the eight months of 1912 and 1911 respectively :—

Station.	For August, 1912.	Average To End August.	To End August, 1912.	To End August, 1911.	Station.	For August, 1912.	Average To End August.	To End August, 1912.	To End August, 1911.
Adelaide	2.12	15 01	12.32	9.80	Hamley Bridge	2.55	11.58	7.91	9.41
Hawker	1.46	8.25	7.72	5.93	Kapunda ...	2.80	13.83	9.33	10.54
Cradock	1.57	7.31	5.12	5.27	Freeling	3.42	12.52	9.74	9.97
Wilson	1.66	8.00	7.80	4.67	Stockwell ...	3.42	14.23	11.33	12.02
Gordon	2.02	5.97	6.35	4.90	Nuriootpa ..	3.82	14.96	11.38	9.63
Quorn	2.19	9.54	11.16	5.75	Angaston ...	3.64	15.25	13.70	14.99
Port Augusta	1.67	6.23	6.98	5.96	Tanunda	4.47	15.64	16.28	16.09
Port Germein	1.97	8.59	6.95	7.02	Lyndoch	3.60	16.34	12.64	12.69
Port Pirie ..	1.62	8.87	6.52	9.54	Mallala	2.30	11.87	8.43	9.90
Crystal Brook	2.76	10.46	9.49	10.15	Roseworthy .	2.67	12.25	8.60	8.68
Pt. Broughton	1.52	9.96	8.92	9.54	Gawler	2.62	13.68	9.57	9.47
Bute	1.63	10.91	8.27	12.18	Smithfield ..	2.00	11.76	9.14	10.11
Hammond ..	2.15	7.37	6.73	9.21	Two Wells ..	1.87	12.16	7.33	8.11
Bruce	1.99	6.14	7.96	4.54	Virginia	2.84	12.65	8.81	8.92
Wilmington .	2.66	12.36	13.71	10.92	Salisbury ...	2.34	13.36	10.00	12.05
Melrose	3.01	16.11	14.47	12.07	Teatree Gully	3.42	20.16	15.33	13.62
Booleroo Cntr	2.22	10.76	8.01	7.27	Magill	2.82	18.62	14.02	13.61
Wirrabara...	2.94	13.00	12.03	8.45	Mitcham	2.31	19.72	11.72	12.76
Appila	2.48	9.94	12.37	8.92	Crafers	4.01	34.03	23.89	31.12
Laura	2.73	11.99	9.13	10.58	Clarendon ...	2.67	24.98	15.65	20.66
Caltowie	2.59	11.34	8.41	11.34	Morphett Vale	2.17	17.15	11.14	13.96
Jamestown ...	3.17	11.38	12.08	12.41	Noarlunga ..	2.10	14.84	10.75	13.59
Gladstone ...	2.60	10.53	8.16	10.88	Willunga ...	2.18	19.06	12.80	18.90
Georgetown .	3.29	12.56	10.69	11.32	Aldinga	1.72	14.97	9.90	12.37
Narridy	2.26	11.63	9.45	11.62	Normanville	1.67	15.32	9.33	13.31
Redhill	2.25	11.57	10.50	9.79	Yankalilla...	2.11	16.62	11.74	15.97
Koolunga ...	1.88	10.92	9.19	9.72	Eudunda	2.16	11.74	9.72	11.38
Carrieton ...	2.36	8.12	7.46	6.49	Sutherlands .	1.55	—	6.88	7.00
Eurelia	2.50	8.83	8.71	6.91	Truro	4.22	13.58	13.86	11.63
Johnsburg ..	2.02	6.49	7.68	5.69	Palmer	2.66	—	9.34	8.56
Orroroo	2.62	9.34	8.05	6.41	Mt. Pleasant.	3.88	19.44	12.92	15.82
Black Rock ..	2.31	3.37	7.73	7.38	Blumberg	3.70	21.74	14.23	16.43
Petersburg ..	2.14	8.55	8.63	8.22	Gumeracha ...	3.84	24.05	16.74	19.35
Yongala	2.10	9.11	7.56	9.02	Lobethal ...	3.55	26.23	16.02	21.45
Terowie	1.67	8.86	7.42	8.03	Woodside ...	3.56	22.67	16.21	20.99
Yarcowie	1.89	9.11	8.33	9.17	Hahndorf ...	—	25.58	13.34	24.63
Hallett	2.49	11.08	8.88	10.26	Nairne	2.45	20.63	12.52	21.25
Mount Bryan	2.47	10.77	9.79	8.96	Mount Barker	2.58	22.32	14.39	20.63
Burra	2.49	12.25	11.31	11.01	Echunga	2.58	23.54	15.60	23.73
Snowtown ...	1.35	11.07	9.04	8.40	Macolesfield .	2.29	21.70	13.44	20.92
Brinkworth ..	1.61	10.17	9.74	9.56	Meadows ...	3.10	25.51	17.07	24.64
Blyth	1.42	11.31	8.19	10.42	Strathalbyn .	1.73	13.57	9.87	13.40
Clare	2.46	17.11	12.54	14.78	Callington ...	1.26	11.21	6.16	9.20
Mintaro Cntrl.	2.12	15.37	9.90	13.85	Langhorne's B.	1.35	10.66	6.45	8.40
Watervale ...	2.39	19.38	12.27	16.19	Milang	1.16	12.14	6.17	6.50
Auburn	1.72	16.94	9.11	14.86	Wallaroo	1.30	10.07	10.95	11.44
Manoora ...	1.65	12.45	7.54	9.93	Kadina	1.33	11.63	10.06	10.80
Hoyleton ...	1.50	12.93	6.78	11.16	Moonta	1.15	11.16	9.23	9.80
Balaklava ..	1.48	11.21	6.37	10.34	Green's Plains	1.54	11.48	8.09	8.23
Pt. Wakefield	1.38	9.50	6.72	12.54	Maitland ...	1.98	14.82	9.61	13.97
Saddleworth	1.90	14.08	7.94	10.58	Ardrossan ...	1.21	10.09	7.41	9.40
Marrabel ...	1.76	12.32	7.06	8.37	Pt. Victoria .	1.31	11.17	8.54	11.64
Riverton ...	1.74	14.40	8.09	12.42	Curramulka .	2.26	13.81	8.54	11.38
Tarlee	2.13	12.16	8.39	9.16	Minlaton ...	2.42	13.09	8.68	10.71
Stookport ..	2.97	11.22	8.23	8.21	Stansbury ...	2.00	12.42	9.34	11.90

RAINFALL TABLE—*continued.*

Station.	For August, 1912.	Av'ge. to End August.	To End August, 1912.	To End August, 1911.	Station.	For August, 1912.	Av'ge. to End August.	To End August, 1912.	To End August, 1911.
Warooka ...	—	13.34	7.54	14.52	Bordertown .	2.45	13.47	8.31	11.36
Yorketown .	1.55	12.98	9.05	11.40	Wolseley ...	2.32	11.85	7.85	—
Edithburgh .	1.51	12.19	8.31	9.84	Frances	2.06	13.61	10.33	14.71
Fowler's Bay	1.13	9.60	8.25	10.61	Naracoorte .	2.47	15.56	11.52	15.04
Streaky Bay	1.49	11.86	11.55	12.63	Lucindale ..	2.49	16.57	11.77	17.20
Pt. Elliston .	2.55	12.66	12.00	14.14	Penola	2.72	18.71	14.77	19.02
Pt. Lincoln..	1.83	15.16	14.48	13.35	Millicent ...	3.39	21.43	17.06	25.06
Cowell .....	.41	8.31	7.17	7.84	Mt. Gambier.	3.43	22.44	17.33	24.45
Queenscliffe .	1.71	14.00	11.81	—	Wellington .	1.53	10.37	7.04	8.61
Port Elliot .	1.48	14.95	9.92	11.49	Murray Brdg.	1.57	9.76	6.05	7.07
Goolwa	1.69	12.77	10.56	12.10	Mannum ...	—	8.18	4.37	4.99
Mcningie ...	2.00	13.66	8.94	10.31	Morgan	1.18	5.83	5.88	5.67
Kingston....	4.67	18.33	19.85	16.47	Overland Crnr.	1.00	7.27	6.13	8.05
Robe	2.88	18.81	12.80	18.02	Renmark ...	1.04	6.72	5.61	7.61
Beachport...	2.99	20.84	14.62	23.78	Lameroo ...	1.18	—	9.90	—
Coonalpyn ..	1.69	12.30	9.32	10.81					



A Shire Sire at Sandringham.

FARM ANIMALS.

HEREDITARY UNSOUNDNESS.

By J. F. McEACHRAN, M.R.C.V.S., Government Veterinary Surgeon.

Amongst horseowners it is recognised that a sound horse is better than an unsound one, the sound animal being one that is capable of doing everyday work, and not being affected with anything that is at all likely to produce lameness, and thus interfere with its usefulness. It is quite unnecessary to go into the question of heredity. Suffice it to say that certain diseases affecting horses are laid down as hereditary unsoundnesses, and in the existing regulations dealing with the veterinary examination of stallions for the Government certificate of soundness the following list of hereditary unsoundnesses is prescribed:—Sidebone, ringbone, bone spavin, thoroughpin, bog spavin, bursal enlargement and curb, roaring, shivering, cataract, and osteo porosis.

Stockmen are already aware of the conditions governing the examination of horses for the Government certificate, and the reports of the results of the examinations since the inauguration of the system have been published. The report for the year ended August 31st, 1912, is now in course of preparation.

That a large percentage of our horse stock are affected with certain hereditary unsoundnesses is now an established fact, and it is well that the more prevalent of these diseases should be described, so that owners themselves may be able to recognise them. Breeders should be very particular only to breed from absolutely sound stock.

In South Australia the unsoundnesses met with, in order of frequency, are as follows:—Sidebone, ringbone, bone spavin, thoroughpin, and curb.

SIDEBONE.

By far the commonest unsoundness is unquestionably sidebone. It is extremely common amongst draught horses, and its hereditary character has been clearly demonstrated.

Now, what constitutes a sidebone? To clearly understand the term it is necessary for the farmer to know that at the heels of a horse's coronet are to be found what are called the lateral cartilages. These are flexible plates, and when examined in their normal or healthy state they are springy, elastic, and easily moved. They are of much consequence to a horse, and especially

a draught horse, as they prevent undue concussion on the other soft structures inside the hoof. Simple sidebone may be defined as a conversion of the lateral cartilage of the foot into a bony condition by the deposit of lime salts. The ossification of the cartilage may or may not be complete, but if the sidebone is forming, there is the hereditary tendency or taint, and practically to the same extent as if the cartilages had undergone complete bony change.

In order to distinguish sidebones the farmer should accustom himself to the normal condition of the lateral cartilages. Regular examinations of the cartilages, which, when pressed, should be yielding and elastic, ought to be made. Any deposit of bone can be immediately recognised, as the cartilages become quite hard, and often much enlarged.

Amongst a certain section other influences, apart from hereditary tendency, have been attributed as causes of sidebone. These may be enumerated in order as follows :—1. Concussion. 2. High-heeled shoes. 3. Injury to the coronet.

That concussion plays an important part in the ossification of the cartilage cannot be questioned, and it is generally accepted that sidebones develop quickly when horses congenitally predisposed to the disease are worked on hard roads ; but it is extremely interesting to observe the existence of sidebone in young horses (and often a number with family history) which have never worked on hard roads, but have been on soft country since foaled.

To follow up the concussion view. Owing to the nature of their work, it would naturally be expected that light horses, such as hackneys and ponies, would be prone to sidebone ; but during the examinations in this State very few cases were discovered in light horses, and amongst these hereditary tendency was evident.

The fact that none of the horses with sidebone examined in this State were shod with what is termed a high calkin or heel, and a large number had never been shod in their lives, dispenses with high heels as a cause, or even a contributing cause, of sidebone.

Injuries to the coronet in the region of the lateral cartilages occur frequently to draught horses working in teams, and the subsequent appearance of sidebone is sometimes an accomplished fact ; but many horses are injured severely in that region and no trace of ossification of the cartilage can be found. Sidebones which have appeared after injury would have developed without, as the hereditary tendency must have existed.

It is quite a simple matter to test the injury or tread theory, and it will be found that, notwithstanding severe injuries to the coronets, only horses with the sidebone taint will be found with sidebones.

Sidebones are usually found in the fore feet. Sometimes only one cartilage is affected, but as a rule both cartilages in the fore feet are ossified. Occasionally sidebone presents itself in a hind foot, but this is a rare condition.

In examining horses with sidebones it will be observed that a certain class of foot is indicative of hereditary predisposition, viz., those with flat, straight heels. In purchasing horses, horsebreeders would be well advised to pay particular attention, not only to the top of the horse, but also to his legs and feet, and look for animals with strong, well-developed feet, and the heels of which are strong and nicely turned.

It is impossible to state definitely how long it will take for a sidebone to develop. Sidebones have been observed in horses under two years, and are usually well developed before a draught horse is five years of age. Cases are on record in which the lateral cartilages were normal at five years and sidebones appeared afterwards, but such cases are not common.

The lameness of sidebone is characteristic. The stilty action and want of spring clearly demonstrates the nature of the complaint; and on hard roads especially it will be seen that the sideboned horse puts his toe to the ground first.

Treatment for sidebones is practically useless. Notwithstanding arguments to the contrary, sidebone is an hereditary unsoundness of great economical importance to this State, and horseowners who have dearly bought their knowledge and know some of the tainted families should do all in their power to prevent the use of sideboned sires and dams for breeding purposes.

(To be continued.)



AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE AT COWELL.

A Conference of Agricultural Bureau Branches of the Franklin Harbor District was held at Cowell on Friday, August 2nd.

The following delegates were present :—Messrs. J. W., E., and J. P. Story, H. R., F., and J. S. Jacobs, A. M. and P. G. Wilson, and W. E. Hier (Miltalie Branch) ; G. W. Story, A., J. Y., and J. F. Robertson, N. P., J. N., and A. P. McCallum, F. Beinks, M. Frost, B. Howell (Yabmana Branch) ; A. Ramsey, M. S. Hunt, W. H. Stephens, H. and J. R. Hill, P. H. Sinclair, M. Abrook, T. C. and H. T. Hornhardt, G. C. Bilney, W. H. Gale, D. Holmes (Utera Plains Branch) ; R. B. Deer, S. H. Pearce (Yadnarie Branch) ; G., P. C., A. C., and S. Wake, W. T. Cooper, P. G., H. W., and H. J. Wheeler, A. O. Chilman, A. E. Storey, C. T. Jacobs, F. Freith, G. F. and E. E. Elleway, H. Schumann. There were also present Messrs. W. Lowrie, M.A., B.Sc. (Director of Agriculture), F. E. Place, B.Vc., M.R.C.V.S., G. G. Nicholls (Secretary Advisory Board of Agriculture), and a large number of farmers and others.

A PLEASING TRIBUTE.

Mr. A. M. Wilson, who was voted to the chair, presided over an attendance of about 60. He said that great interest was taken in the work of the Bureau on Eyre's Peninsula. There was room for more Branches at such places as Mangalo, Warren, and Cleve. It was a noteworthy fact that the best farming was in evidence in those places where there was a Branch of this association. There had been considerable activity in the Bureau recently, and new Branches had been formed at the rate of two a month during the past year. He welcomed the delegates and visitors, and expressed great pleasure at the presence of Professor Lowrie in this new district.

THE ERECTION OF FARM FENCES.

Mr. P. H. Sinclair, of the Utera Plains Branch, introduced the first matter for consideration in an excellent paper on "Farm Fencing." "Durability and neatness," he said, "were features which should receive special care in permanent improvements such as fencing. Bad fences caused bad neighbors and much inconvenience generally. The vermin-proof fence was the one needed in this district. A line should be cut and cleared at least 10ft. from any scrub or undergrowth, and the fencing would thus be safe from

bush fires or sand drift. The posts should be of the best material obtainable. If sandalwood or pine could be procured the posts should be cut 5ft. 4in. long and be trimmed free from spurs and splinters. The tops should be neatly cut. He would dig the postholes square all the way down, and 20in. deep. It was best to sink a whole line at a time, and then with one man putting in the loose posts and shovelling in the earth, the work would proceed at a good pace. A post should never be sighted from the back line, and with a light bar for a rammer the plumbing and sighting could be done at the same time without looking at the back line. The boring should be done with $\frac{5}{8}$ in. augers, to prevent the wire from rusting in the holes. The gauge of fence should be as follows :—Posts, 3ft. 6in. high, not more than 12ft. apart, and 36 in a strain ; strainers, 3in. higher than the posts. All strainers in the line should be strutted one way, and the corner post should be strutted both ways. A good strong barb should be put on top with two plain No. 8 galvanized wires and netting below. The first plain wire should be 12in. from the barb, and come flush with the top of the netting, and the second one 11in. from the top of the netting. The barb should be tied on every post with No. 18 wire, and the netting should be tied with small wire three times on to the first plain wire and twice on the second one in every panel. One and a quarter inch mesh netting was most effective against vermin. The trench should be loosened up with a grubaxe and then cleaned out with a round-mouthed shovel, making a clean, wide furrow 5in. deep. This made an excellent sheep-proof fence with the netting on, and if the netting had to be removed when extending the area of cultivation and sheep were not kept, there would still be a good durable three-wired fence proof against large stock."

DISCUSSION.

Mr. A. Venning said he preferred to have the second wire barbed also on the top of the netting, to keep stock from rubbing themselves against it. Mr. Ramsey thought 3ft. 6in. too low for a fence where the land was liable to drift : 4ft. was a better height. In replying, Mr. Sinclair said that a 4ft. fence would have such a gap between the top wire and the netting that stock would put their heads through and soon learn to be troublesome fencers.

SHEEP FOR FRANKLIN HARBOR DISTRICT.

Two practical papers under this title were contributed.

Mr. M. R. Frost (Yahmana) said as the district became settled and weeds spread over the land it became necessary to keep sheep. By the exercise of a little care the sheep could be turned into a very satisfactory investment. The farmer should study his own conditions and work accordingly. For that district the pure Merino was the best breed. Heavy freight and charges prevented the sheepowner from exporting lambs and mutton at a profit, and the local demand for meat was not great, so that wool was the first con-

sideration. By judicious selection of rams the flock could be brought to a high standard. In the choice of a ram, density of fleece should be looked for rather than length of staple. If the ewes were at all fine woolled, the progeny would then carry a heavy fleece of very fine wool. That would weigh well and would command the highest price. At least once a year the flock should be rigorously culled, and the aged sheep and any showing signs of rough or coarse wool passed out. These should be marked off for killing. The sheep which produced the heaviest fleece of good wool would, in nearly every case, prove to be the most profitable.

Mr. C. Mowat's paper read much as follows :—" There is not the slightest doubt that sheep are a paying side line for a farmer who mainly depends on wheat for his income. The cost of keeping, say, 200 sheep, is practically nothing, and one can expect a nice return from a flock of even this small size. It behoves the farmer to buy sheep of good pure strain. The expense may be a little more, but this is a duty to the country, as it will, in years to come, raise the standard of Australian wool. The pure big-framed Merino is hard to beat anywhere, and especially so in this district. Although this class of sheep is admittedly not the equal of Down or Dorset Horn-Merino crossbreds for fat lamb raising, there is no handy market for fat lambs ; therefore, the wool-producing feature is rendered more prominent, and in this the Merino takes one's fancy. As a rule, Merinos will cut a heavier fleece than the crossbred, and, in addition, the market prices for their wool do not fluctuate as for crossbred wool. Merinos also do better in dry country. They are quiet and do not trouble fences when a wheat crop is on the other side, as the crossbreds are so wont to do. Some little labor is required to put up yards, but where there is such a small flock and dipping is unnecessary, this takes only a day or two. In this district it is wise to have the yard dog-proof, as wild dogs are far too prevalent, and tame dogs have developed a taste for sheep. It is advisable to yard the sheep every night, otherwise one's profits may literally ' go to the dogs.' For such a few sheep no special shearing-shed is required, so the expenses of installing a flock are very slight indeed. To get the best results from the pasture available, paddocks need to be fairly small, say, 60 acres or 80 acres in extent. This means extra fencing, but the value of the property is greatly enhanced thereby. The sheep should be turned into one paddock until they have eaten it well off and then turned into another. This is much more economical than letting them run in 200-acre or 300-acre blocks, as by spelling the paddocks the feed has a chance to recover and other stock can be put on it first. In addition, one knows better where to find the sheep when yarding-time comes each night. A flock is very useful in keeping down the weeds on fallow, and in breaking up clods, and making a good seed bed. Some farmers believe in feeding off growing crops to make the plants stool better, but I think this weakens the crop and gives the weeds a better chance. Sheep do remarkably

well on dry feed if they have a sufficiency of water, and this should be assured. It is preferable to have the water in troughs, as all stock pollute the water when allowed access to a dam. A windmill or pump would be required with the troughs. The windmill and floating ball taps are to be preferred, as they keep the troughs full. A lick of rock salt is a good help to keep sheep in condition when feed is dry, and in winter it makes them thirsty and consequently they drink better. A good tonic is sulphate of iron, which can be given to the stock by dissolving it in the troughs. It is essential to have at least two rams per 100 ewes to get the best results. The rams should not be kept too long with the ewes, or lambs will be coming on when feed is going off. The most suitable time to have the lambs coming on is in May, as they catch the feed in its young stage and have a chance to get a bit used to life before the cold and wet weather really sets in. A rough estimate of the returns one could expect from a flock of the size mentioned is as follows:—Wool cut, about 9lbs. or 10lbs. each, would bring £60 clear; and 100 lambs should sell at 7s. each, making £35. A total of approximately £100 per annum, and from such a small expenditure in time and labor, is a handsome return. There is also to be considered the saving in the provision of mutton for the house. It is hard to put a definite value on the work done by the sheep in cleaning and manuring the fallow, but as work saved means money gained, that must be put to the credit of the sheep. A farmer who is not keeping sheep is not getting as good a return from his land as he should."

THE DISCUSSION.

Mr. Jacobs and Mr. Storey (Miltalie) had both kept sheep for many years, and were convinced that they were a paying proposition when worked in conjunction with wheat-growing. Mr. Jacobs had tried the Shropshire cross, but they were such bad fencers that he cleared them out. All things considered, the Merinos paid best. Mr. Storey preferred not to yard the sheep, as this practice reduced the value of the wool.

Mr. T. W. Storey (Yabmana) thought it best to breed for length rather than density of staple. Both these qualities could be secured in the Merino.

In replying, Mr. Frost said there was a tendency on farms to get the wool long and coarse, and he therefore advocated the use of rams with density and quality of staple.

AGRICULTURE AS A PROFESSION.

The Chairman (Mr. A. M. Wilson) read an interesting paper, in which he said that the day had gone by when "any fool" could be a successful farmer. Not only did the farmer need brains, but educated brains. Science had come to the aid of the agriculturist by investigation, collection, and recording data relative to crop-raising and stock-breeding, &c. Many farming practices which had long held sway had, by careful test, been found unreliable, and

others had been suggested which had led to greater returns being won from the land. Observation and the power to make logical deductions were important qualifications to the farmer, but further knowledge was also necessary. Chemistry, as applied to the soil and to stock complaints, was a study worthy of attention by farmers, while some knowledge of physiology, geology, and botany was of great value. The farmer had to ascertain the nature and needs of the different soils on his holding, both in regard to fertilisers, depth to cultivate, and general treatment, as well as the crops or varieties of seed most suited to it. He must study the laws of breeding, and know something of the relative value of various foods if he would win the highest return from his labors. Much could be learned by careful experiment to supplement that knowledge gained from the study of the various branches of science enumerated. Considerable knowledge of mechanics was necessary, that the maximum of power might be secured at a minimum expenditure of energy. A knowledge of blacksmithing, masonry, and carpentry was essential on the farm, where buildings had to be erected, tanks constructed, implements repaired, and engines and machines kept in order. The farmer also had to keep in touch with market reports if he would sell to the best advantage the produce of his land. He should have a "den" or study, and procure the latest books relative to the various phases of his calling, and should encourage his sons to develop the same habit of reading to keep abreast of the times. In conclusion, the writer appealed to the patriotism of the farmer to make the best use of his land in the interests of his country as well as himself.

THE DISCUSSION.

Mr. J. N. McCallum (Yabmana) thought that bone and muscle, coupled with some enthusiasm, were the main essentials to successful farming. The power of observation should be developed to the highest possible degree, as this enabled the farmer to correct his practice from time to time by the results of his own and his neighbor's experience and results.

Mr. G. G. Nicholls urged the wisdom of carefully studying the various articles and papers printed in the *Journal of Agriculture*, and advised all farmers to procure the Victorian and New South Wales *Journals* in addition, as these contained most valuable contributions which were, in many instances, applicable to conditions in South Australia.

DESTRUCTION OF WEEDS BY FALLOWING.

A discussion on this subject was initiated by Mr. G. B. Kobelt (Yadnarie), who advised farmers to keep their land as free from weeds as possible. Weeds became a great enemy to the wheatgrower. Already he had noticed in that district four fast-spreading weeds—Scotch thistle, turnip weed, dandelion, and stinkwort. The last-named, it was claimed, loosened and enriched the soil. He had never found it any good, as it robbed the fallow of moisture,

and a thick growth would choke any cultivating implement. Farmers who had the necessary strength should not be afraid to put a little extra draught on the plough to pull up as many green stumps as possible, because mallee country, logged and burnt, was really only half cleared. Land from three to four years old should be ploughed up to a depth of 5in. New land should be ploughed not deeper than from 3½in. to 4in. He believed it was better to fallow newly-burned land than to leave it lying idle until the following seeding time, as otherwise the rain would not easily penetrate its ashy surface. In addition, that course facilitated seeding operations in a dry autumn. Weedy fallows should be worked at least twice before the drill was used. He advocated working with a light cultivating plough just before hay time, to prevent all weeds from seeding. The second working should be done a few days after the first summer rain. This would stop the growth of young weeds. The farmer who attended to the destruction of weeds at the proper time got the best results.

THE DISCUSSION.

Mr. McCallum considered fallowing should be finished by August. Mr. W. Cooper thought wild turnip was the worst weed in the Elbow Hill district, while dandelion and stinkwort came next. No rule could be laid down as to the depth to fallow, as this depended on the character of the soil. He would finish his fallowing before August, if possible, and harrow after every good rain. The Chairman thought it advisable in some circumstances to fallow land two years in succession, in order to get rid of the weeds.

FIELD TRIALS.

The matter of making field trials of implements more successful and of greater value was introduced by Mr. C. E. Jacobs, of Elbow Hill. He thought that field trials should be encouraged rather than agricultural shows in new districts where smart turnouts were a luxury. Field trials gave settlers an opportunity to exhibit a good team, and brought implements into the district for open trial before the farmers.

Mr. Robertson (Yahmana) thought there was room both for the field trial and for the show, but the country selected for the trial should be of such a nature as to provide a genuine test. Such trials had been held on well-cleared land. Other speakers urged that the field trial was of great value to the farmer.

AFTERNOON SESSION.

About 80 farmers assembled after lunch, when questions concerning stock were answered by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., at the close of a veterinary demonstration.

LOCKJAW.

The tetanus germs, Mr. Place said, were present in certain places, particularly in dirty stables, and entered the animal through wounds such as

might be made by a stake, barbed wire, or wounds in the bowels made by worms. The symptoms of the disease were then described at length. Given reasonable conditions, the speaker said, nature would fight against the trouble. If the weather was good he would leave the patient alone. If cold and wet prevailed, he should be placed in a dry stable and well looked after, having sloppy bran mash in which some Epsom salts should be administered. The salts could also be given in the drinking water, but drenching should not be resorted to. The animal should be kept as quiet and as comfortable as possible.

EFFECT OF WORM POWDERS ON MARES IN FOAL.

Tartar emetic and santonin, the speaker said, were both liable to upset a mare sufficiently to cause her to slip her foal. Both these drugs would upset a mare's digestion if given in sufficient quantity, and so would be likely to upset the unweaned foal. It was best to keep off all these drugs under such conditions.

BOTS.

Mr. Place explained that the bot fly laid her eggs on the hair of the horse in several parts, where they remained, adhering by a sticky substance with which they were coated. Within about 36 hours they hatched, and the tiny maggots, if such term might be used, caused intense irritation to the horse by wriggling. The animal, in trying to rub them off, got them into its stomach, either directly through the mouth, or by rubbing them into the manger and picking them up in the food. They then became firmly attached to the lining of the stomach by two horny spikes. The bots were capable of throwing off oil, water, acid, or salty substances, and if these were administered the bots would hang tight and continue to suck the blood of the horse. If a man suspected that his horse was troubled with bots, he should starve it for 24 hours, and then the first thing in the morning give 4ozs. or 5ozs. of ox or sheep gall in a pint of lukewarm milk; and then, two hours after, give a purgative of raw linseed oil. Bots were not often responsible for the death of horses, but they lowered the condition of the animal and some other complaint killed them.

IMPROVEMENT OF BUREAU MEETINGS.

A practical paper on this subject was delivered by Mr. Jacobs, of the Miltalie Branch. Mr. Jacobs urged that members as a first duty should be regular and punctual in attendance, and should be prepared to take an active part in the discussions which occurred. They should also take a turn in reading a paper or opening discussion on seasonable and important topics. There was no reason why members should be bashful, or afraid that their efforts would be discounted by grammatical or other errors. What was needed was a plain statement of experiences or opinions. Some men left their paper-writing till the last moment, and were then unable to give their subject

that consideration that it deserved. Homestead meetings were of much value, and should be arranged periodically.

Mr. Searle spoke of the benefit which he had personally derived from his association with the Bureau. There was much to learn, and science was bearing more and more upon the cultivation of the soil. The Bureau members should constantly aim to keep in touch with what the chemists and biologists were doing, and relate the knowledge gained to their calling upon the land.

Mr. G. G. Nicholls urged upon members the advisableness of conducting experiments upon their several farms, that they might have more valuable data to discuss at their meetings. The amount of super. which would give the greatest profit per acre, for instance, could only be proved by careful experiment. It was time for the Bureau to take up more work of this kind. The papers which were of greatest value to Branches and of most interest to readers in the *Journal* were not always those which were expressed in flowery language or were faultless in grammar. Any little touching up necessary was seen to before printing. Members' own experience, and the conclusions at which they had arrived by observation and deduction, were usually well worth consideration by others.

RABBIT DESTRUCTION.

This question was introduced by Mr. G. F. Wake (Elbow Hill). Rabbits were a pest, he said, to both graziers and farmers. The authorities who were responsible for the administration of the laws relative to the destruction of rabbits were not strict enough at the right time of the year. He considered all landholders should be compelled to lay poison at a fixed time, just after harvest. He followed this method, and then strewed baits of phosphorised pollard in each burrow. After a few days he filled in the burrows with a grubber. Later in the year he dug out the opened burrows and set a few traps. The dogs then got the stray rabbits, and in this way the whole lot could be cleared out. He would be prepared to give 1s. per scalp for any rabbits which could be found in one of his paddocks treated in this manner. The fences must, of course, be kept in good repair. He used 3ft. netting, trenched 4in. to 6in., and fastened to a wire in the fence. Mr. J. J. Deer thought the existing laws were quite strict enough. The best way to get rid of the rabbits was to poison in summer, fumigate in winter, and explode the burrows. Mr. P. H. Sinclair thought it best to dig out the burrows. It was labor well spent. Mr. Searle considered the Vermin Boards had too much to do, and that there should be a small board of, say, three men to enforce destruction.

NEXT CONFERENCE.

It was decided that a committee should be appointed, representative of the Branches of the Bureau in the Franklin Harbor District, next year to make all arrangements for the next Conference.

EVENING SESSION.

There was an attendance of about 150 at the evening session, which was opened with a free parliament. The Director of Agriculture (Professor Lowrie) delivered an address dealing with the cultivation of the soil for wheat-growing.

EXHIBITS.

Samples of the produce of the district were staged in the hall, and comprised capital specimens of cabbages, turnips, swedes, Chinese radish, silver beet, wheat in ear, barley 3ft. high, and chaff.

Votes of thanks to the Chairman and speakers brought the proceedings to a close.

CONFERENCE OF BRANCHES IN PINNAROO DISTRICT.

The first Conference of Branches of the Agricultural Bureau situated in the Pinnaroo district took place in the Institute, Lamerook, on Friday and Saturday, August 23rd and 24th. In addition to the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), the Director of Agriculture (W. Lowrie, M.A., B.Sc.), the Veterinary Surgeon (Mr. F. E. Place, M.R.C.V.S., B.V.Sc.), Messrs. A. M. Dawkins (Chairman), F. Coleman (Advisory Board), and H. J. Finnis (Department of Agriculture), the following Branches were represented by the delegates named below:—Pinnaroo—Messrs. P. J. Edwards, E. H. Parsons, B. H. Nash, P. H. Jones, J. Scales, F. H. Edwards, A. J. Reed, W. H. Kelly, J. Letheby. Parrakie—R. L. Beddome, C. E. Hammond. F. J. Dayman, T. Lewis. Geranium—W. Mitchell, P. Jacob, D. Leahy. W. Pannell, W. J. Mitchell, G. Charlton, C. Reed, F. Norton, C. D. Dunn. Moorlands—C. F. Bauer, R. Neumann, A. Oppat, L. Spurr. Wilkawatt—D. F. Bowman, W. J. Tylor, M. Neville, J. Walters, F. Gasmuir. Lamerook—Crosby, W. J. Trowbridge, A. J. Koch, F. W. Eime, R. O'Connor, R. B. Koch. Parilla Well—J. Gray, J. W. Johnston, E. H. Leak, J. E. Johnson, R. M. Shannon, L. G. Neville. Clanfield—W. Paul, A. Richards, W. Queale, A. Orwill. A large number of visitors also attended each session.

The chair was occupied by Mr. W. J. Trowbridge, President of the Lamerook Branch.

MINISTER'S OPENING ADDRESS.

In opening the Conference, the Minister said he was agreeably surprised at the wonderful transformation which had been effected in the district since his previous initial visit in 1902. Judging by what he had seen and read the settlers had done great work, and the district had become one of the foremost wheat-producing areas in the State. He was glad that the farmers were banding together for the purposes of mutual education and help. The officers of the Agricultural Departments in the other States placed the South Australian tillers of the soil in the forefront, and had attributed their progressiveness mainly to the influence of the Agricultural Bureau. The Victorian Director of Agriculture recently said he had been astounded to find the South Australian farmers in Conferences holding their own with professors and agricultural experts, and had admitted that such a thing was utterly unknown in his own State. He had added that it was simply glorious to attend a Conference at which South Australian agriculturists were present, because of the intelligent interest which they manifested. One evidence of the intelligence of the farmers in that district was that they had formed a Branch of the Bureau. That innovation had been made at Lameroo only five years ago. To-day, between Tailem Bend and Pinnaroo, and including Clanfield, there were nine Branches. It was gratifying to reflect that the Bureau system was extending rapidly all over the State. During the last 12 months Branches had been formed at the rate practically of one a fortnight. Now the organizations totalled nearly 140. Not only had the number of Branches increased, however, but the Upper Northern District Conference had been revived, and new district meetings had been inaugurated on Yorke's Peninsula, on Eyre's Peninsula, and in the Pinnaroo district. When they realised what the Bureau system had done for farmers they looked forward with the greatest hope and confidence to the future. Personally he believed that the men on the land in South Australia had only just learned the first principles of agricultural science, and what they had done was as nothing compared with what they would accomplish. He had noticed with pleasure that at a recent meeting of the Lameroo Branch the members had unanimously expressed the opinion that excellent benefits would be derived in that district from fallowing, and he felt certain that, generally speaking, when once they had properly cleared their land of shoots and stumps it would pay them to put in 50 per cent. less in the way of crops, because they would probably get 50 per cent. more from the reduced area by means of thorough and scientific cultivation. It was a keen satisfaction to him to attend the Conference, and he sincerely trusted, in declaring it open, that it would prove to be of the utmost benefit to all.

REMARKS BY THE CHAIRMAN.

Mr. Trowbridge said he greatly appreciated the honor of presiding over the first Conference of the Bureau held in the Pinnaroo district. He accorded

a hearty welcome to the visitors, and trusted a profitable time would be spent by all. The value of the Bureau system could not be overestimated, and he suggested that other Branches should annually hold a "Report meeting." Some time ago the Lameroo organization had set aside one day when each member furnished a comprehensive report covering his tillage and seeding operations and the yields obtained. The innovation had delighted everybody and had been most instructive. Other Branches probably would have equally encouraging results.

AFTERNOON SESSION.

SAND IN HORSES.

The Veterinary Lecturer of the Department of Agriculture (Mr. F. E. Place, M.R.C.V.S., B.V.Sc.) delivered an interesting address on this subject. There was a tendency amongst stockowners, he said, to ignore what appeared to be trifling illnesses, until the condition of their animals forced home to them that there was something radically wrong. Sand was the cause of a great deal of trouble in districts like those of the Pinnaroo hundreds. The symptoms arising from the introduction of sand into the stomach and bowels of the horse included loss of condition, falling in of the flanks, sagging of the belly with a bulging on the right-hand side, paleness of the eyes, casual griping pains, and voiding with the dung. The action of the sand was to choke the glands in the stomach and bowels, to choke the glands of the pancreas, interfering with the flow of bile from the pancreas, and cause the silting up of the blind gut, better known as the paunch, which ordinarily should have from 7galls. to 7½galls. of very liquid contents, which had to leave by an opening higher up than that by which it entered. The clogging action of the sand, which induced the glands to greater activity to remove the obstruction, was often followed by a weakness of the organs, and the settling of a sediment of sand on the lining of the various membranes.

The time to be concerned about a horse was when it was turned out on sandy pastures, as it was certain to get sand into its system. Over the border, many people recommended the administration of strong coffee, and its value was due to its stimulation of the nervous action which enabled the organs to break the settled sand and assist in its ejection. It was a wise plan now and again to give the horses a good dose of coffee (½lb.) mixed with their feed, or to administer as a drench. Other home remedies included honey and milk, and both were scientifically sound. The honey had a stimulating effect upon the working of the small bowel, and hastened the sand through in a loosened condition to the larger bowel, whence it was passed out more easily. New milk coagulated in the stomach and gave off gas which broke up the cementy condition of sand in the intestines, thus giving the bowels a chance to expel the matter. He did not think they could get drugs to give better results, as their action was directed to the same task

as the homely remedies mentioned. As preventive treatment he advised careful observation of the horse's physical condition, and when the first symptoms were noticed, giving the animal something in his food to hasten the action of the bowels. He emphasized the value of bran mash and boiled wheat. Pollard also was good, but by the time it was in a condition to treat the sand it had lost a good deal of its power. If horses slightly affected with sand were fed with boiled wheat the trouble would generally be removed. Its value depended on its action in loosening the sand.

LAMPAS.

Mr. Place condemned the practice of burning out "lampas," which was an imaginary disease. Such treatment destroyed the animal's mouth pads, which were probably temporarily inflamed by the process of teething. In some cases, where the inflammation was aggravated, bleeding was practised. Farmers could safely use the kitchen fork for the operation, as stabbing with the knife was liable to tap the arteries which were situated in the mouth above the teeth.

THE BOTFLY.

The life history of the botfly was traced by the lecturer, who advised the treatment of infested animals with sheep or ox gall. In reply to questions, Mr. Place said from 7lbs. to 8lb. of boiled wheat a day was sufficient for the horse. Molasses was useful in helping the animals to get the full nourishment from their fodder, but was not sufficient remedy for sand. Epsom salts, at the rate of 4ozs. once a week, was a useful laxative, and to that extent was a preventive. As a purge he preferred aloes balls to salts.

EVENING SESSION.

WHEAT-GROWING.

The Director of Agriculture (Wm. Lowrie, M.A., B.Sc.) addressed the Conference on the subject of the cultivation of wheat in the Pinnaroo district. A modification of established practices, he said, would no doubt be found necessary by the farmer taking up the mallee land. If a criticism could be offered in respect to the general tendency, it was that in the first few years settlers were in too great a hurry to clear the whole of their land. It would be better to concentrate their energies more on a part of their blocks, and to leave the remainder of the scrub untouched until it became possible to deal with it effectually. If, at the outset, they put the fire through the major portion of their properties without having made provision to properly cope with the area so treated, a big percentage of the shoots which subsequently came on would get too far ahead, and the clearing ultimately would prove to be a more difficult and costly matter than if the scrub were completely disposed of a little at a time. Not only would the neglected roots gain renewed

vigor, but they would also contend with the wheat plants and draw moisture from a greater depth. In other words, by endeavoring to get over too much land they would get a lower return from a definite area than would otherwise be the case. A feature of the mallee country was the sudden variations in the soil. Within a few miles they had very free, soft, sandy soil, and fairly strong, good wheat-growing land. The systems and periods of cultivation should therefore vary considerably. As a matter of fact, however, the tendency was toward a common practice throughout the district. Still, he was convinced that experience would demonstrate conclusively the desirableness of adopting different methods according especially to the physical constitution of the soil. The principal process to which their thoughts turned was that of fallowing—the keynote to successful farming over the greater part of the State. To illustrate the effects of fallowing at different periods he had had some soil analyses made at Parafield Experiment Farm and at Roseworthy. The figures obtained amply indicated the advantages of fallowing, and of doing the work at the proper time. It had been found at Parafield, on February 22nd, 1912, that in the first 6in. there was an average of 2·7 per cent. more moisture in fallow than in grass land ; in 12in. the average percentage was 18·76 in the fallow against 11·45 in grass land ; and in 24in. the percentages were 19·37 and 14·25 respectively. That difference of nearly 7 per cent. in the fallow at 12in. meant approximately 32,000galls. of water to the acre, which was equal to 1½in. of rain. It might be accepted as a fact that by fallowing they could ensure an advantage of moisture equivalent to between 3in. and 4in. of rain in the soil within the area which the roots of the plants could readily reach in the course of their growth. At Roseworthy tests of the soil had been made at various depths when the land was ploughed on August 24th, 1911, September 9th, and February 21st. The results were as follow :—August, first 6in., 4·6 per cent. of moisture ; 6in. to 12in., 13·3 ; 12in. to 18in., 17·3. September, 4·2, 13·6, and 15·3 respectively. February, 2·2, 8·2, and 13·9 respectively. They would see that there was a distinct difference in favor of early fallowing, and an advantage which might be worth to the owner quite as much as the fallowing cost. Heavier types of land were benefited to a greater degree than the lighter classes. The rain penetrated fairly freely into most of the sandy soils, but was more difficult to get into the heavier land. The latter, it was true, held more moisture than the former, but when once well saturated they gave the moisture off more rapidly and dried more quickly because the capillarity was more active. Fallowing and the working of fallows, therefore, became the more important where the land was compact and heavy. Ploughing early in the season was in favor of getting the rain into the soil. Having by this means secured the moisture, evaporation could be reduced to a minimum by providing a good surface mulch. The lighter lands should not be worked dry. He believed it had been agreed that in these the roots of the

plants penetrated much more freely, and reached a greater depth without anything like the same encouragement in the early stages in the way of opening up the land than obtained in respect to the heavier classes of soil. He could easily conceive that there might be some light, sandy soils in the new districts which would be benefited considerably by ploughing fairly deeply, thus mixing up with the surface soil at least a proportion of the lime which had been leached down. There was a likelihood that some of the young farmers particularly worked their fallows excessively. So long as they had a free surface it would be well not to go on the land too much. Instead of helping to retain the moisture, excessive working helped to dissipate it through turning up moist soil. It would be sufficient after a rain to put the harrows over the land. A most important feature of cultivation was the inducement of nitrification—the breaking up of the organic matter through the agency of the numerous ferments. These required air and moisture, and thrived best when the temperature was 90° or over. Consequently it was essential to get as much moisture as possible into the ground at the earliest moment. Ploughing late in the season and opening up the land to the bottom of the furrows brought about conditions too dry for healthy ferment life. Early fallowing led to the increase of ferment activity, which was much more important than the gain of 3in. or 4in. of rain. He could not understand why many men this year had put in crops in June and July. They would have been better employed fallowing the land for the next season. On the whole early seeding undoubtedly worked out the best. He had had 17 years' experience in South Australia, and that was the worst season he had ever witnessed. Where there was danger of spring frosts it was advisable to use later varieties of wheat.

MORE MANURE.

He strongly advocated the application of heavier dressings of phosphatic manure. It was regrettable that the light dressings of from 40lbs. to 60lbs. had become so popular, because with each crop they took off they removed more phosphoric acid (in which the South Australian soils were deficient) than they put on. Dressings of 100lbs. of superphosphate, and even more, would be amply repaid, for the fertility of the soil would then be maintained, and perhaps enhanced. The additional manure would also facilitate the growth of natural herbage, and thus indirectly increase the humus in the soil—a most desirable element in connection with the retention of moisture. One of the best of these plants was the clover burr—an excellent forage, and of manurial value in that, being a legume, it introduced nitrogen to the soil. To hasten the establishment of a sward it would be well to go into some of the old farming districts, gather up quantities of clover and other seeds, and distribute them upon the land, especially on the lighter soils.

QUESTIONS.

In answer to questions, Professor Lowrie advised that where takeall had affected the wheat, the stubble should be burned in preference to being ploughed in. Otherwise spores of the fungus which caused the disease would be merely buried in the soil. Oats were not a host for the takeall fungus, and therefore made a good crop on affected land. In fallowing after takeall, care should be taken not to allow speargrass to grow, because it would carry the disease over to the next wheat season. Rolling wheat crops increased the evaporation of moisture. He did not advocate rolling on the ordinary wheat lands, although if the crop were required for hay it might be done with advantage, providing harrowing was carried out afterwards. Rolling on the finer sandy lands, while compacting it, would not do so closely enough to make the loss of moisture from the surface very appreciable. When at Roseworthy College he had rolled and harrowed portions of crops, no difference could be noted between the rolled and untreated areas, but the benefits from harrowing had been distinctly traceable. The latter operation could take place even when the crop was 5in. or 6in. high, providing the weather was suitable. He advised, where fallow was concerned, to harrow after light rains, and scarify after heavy falls. Fallow should be left rough early in the season, and harrowed down by the middle of August. Mallee limestone land was never too wet to work. Lime should not be applied to any soils along with superphosphate, as the contact caused a reversion of the latter into an insoluble condition.

PEA CROPS.

Pea crops supplied one of the best means of increasing soil nitrogen and organic matter. In Western Australia, near York, where the average rainfall was from 16in. to 17in., a farmer had depastured sheep on his pea crops, and their increased value had netted him £3 5s. per acre. The American and German Departments of Agriculture had, as a result of careful researches, estimated the gain to the land from growing crops of peas to be 122lbs. of nitrogen to the acre in one case, and in the other 160lbs. Eight hundred weights of nitrate of soda would be required to supply 122lbs. of nitrogen, and the cost would be £6 12s. Nitrogen, of course, was required with the soil throughout, but the wheat made more demand on the supplies when making rapid growth just before blooming. Clovers supplied nitrogen, but could not be grown in that climate with the same success as peas. In reply to Mr. Shannon, who desired to know if there was any danger of lucerne choking out wheat in the district where there was an average rainfall of over 14in., Professor Lowrie said he did not think they would make a success of lucerne. Mr. Shannon and others, however, cited instances of the successful establishment of plots, and the Professor advised those who could grow this fodder to do so.

FREE PARLIAMENT.**NOXIOUS WEEDS.**

The following resolution was proposed by Mr. S. Parsons (Pinnaroo):—
“That the Conference bring under the notice of the district council the great need for the enforcement of the Noxious Weeds Act in the district.”

While, up to the present, residents in the district had not been troubled with the numbers of weeds which were such a nuisance in the older parts, little attempt was being made to prevent the introduction and spread of these, and immediate action in this direction was imperative. Mr. P. H. Jones (Pinnaroo) seconded. Mr. A. M. Dawkins (Advisory Board) described the attempts made by the Board to secure effective administration of the Act. The Government had been asked to take action, but had replied that the request should come through the local governing bodies. They should get the district councils to bring the subject before the annual meeting of the Local Governing Association. Mr. Coleman, in supporting the motion, stated that if farmers allowed the star thistle to become established, it would cause a great deal of trouble and expense. The resolution was carried.

MORNING SESSION.—AUGUST 24th.**HAY-GROWING IN MALLEE DISTRICTS.**

Mr. F. W. Eime (Iameroo Branch) read the following paper:—

“Farmers in new mallee districts should study the hay supply for their horses before anything else. During the present season some had to buy feed for their horses in order to put their seed in. Persons who have been three years in a new district should be able to grow enough hay to last at least 12 months for their working stock. In good seasons a little more hay than is immediately required should be cut to help over a dry period. I recommend a farmer who has from 16 to 20 horses to feed, to fallow about 60 acres early in July. All stumps should be cut level with the ground, and loose stumps and shoots cleared. It should be worked several times until a fine tilth is secured. Before planting the seed, if possible, the land should be cultivated after rain, then drilled first one way with 40lbs. of wheat and 50lbs. super., and then across with the same quantity of manure and wheat or oats. I should put in half the plot with oats crossed with wheat, and the other half with wheat. Should the season be a good one, from 2 tons to 2½ tons per acre should be cut, or in a season like the past one, from 1 ton to 1½ tons per acre. Even if only 1 ton per acre were cut, enough hay to last for the year, and in a good season, to spare, would be grown. I have grown 2½ tons of hay from wheat and oats cross-drilled on a plot of six acres, it being the fifth crop in succession; and during 1905, 1 ton per acre was secured without any manure, 40lbs. of seed being sown. This proves that

the district will grow the required feed if only the land is treated in a proper manner."

Mr. Dawkins (Advisory Board), in congratulating the writer of the paper, said it would pay the farmers in the mallee country to go to some little trouble in preparing 40 acres or 50 acres for the purpose of providing feed for their horses. Oats should form a large part of the crop for hay, as horses did very well when fed on oaten hay cut at the right time. In the Gawler River district this crop had to be cut just about the time the straw began to turn purple. In addition, owing to its immunity from takeall, oats was an excellent seed to sow on land where this fungus was troublesome. The best time to cut wheat was when the grain was in the milky stage, before it became hard, and just after it had flowered. He believed in feeding a fair amount of long hay to the horses. The only way the farmers could ascertain the best wheats for hay for the district was by experimenting. The most suitable wheat, so far as his land at Gawler River was concerned, was Leak's Rustproof. It would suit the Pinnaroo district well, but should be sown early. White Tuscan was another excellent variety. The hay had a beautiful aroma, horses were very fond of it, and it yielded a good cut. Indian Runner was a high-growing wheat which made it difficult to handle. Le Huguenot was a good variety, but it did not stool well; mixed with oats it made a good hay.

Mr. C. F. Bauer (Moorlands) did not think the trouble and time spent in cross drilling were warranted. If oats and wheat were mixed together, and the mixture were sown through the oat device on the drill, equally satisfactory results would be obtained. The finest crop of hay grown in the district was cut from a seeding of equal parts of Yandilla King wheat and oats. White Tuscan was a very nutritious fodder, and it could be grown well in the locality. The trouble with the Le Huguenot was that it was so difficult to bind.

Mr. J. Gray (Parilla Well) was disappointed that the district had not produced enough hay to provide for its own requirements. In addition to growing sufficient for the upkeep of 20 horses, he had, during the past season, been able to dispose of upwards of £200 worth of hay to his neighbors. There was not the slightest reason why the farmers should not produce their full requirements in this regard. He had mixed Marshall's No. 3 with Le Huguenot, and an excellent class of hay had been the result. He cut his crop fairly green last year, and it was the best sample of hay he had seen since he came to the district. His practice was to feed a fair amount of bran and pollard to his horses, and they were doing very well.

Mr. J. W. Johnston (Parilla Well) believed in carrying a two years' supply on the farm. He had found the practice of cross-drilling wheat and oats a great success.

Mr. Crosby (Lameroo) had tried the cross-drilling of wheat and oats on stubble land, but it turned out a failure.

Mr. D. F. Bowman (Wilkawatt) pointed out that if a stack of wheaten and oaten hay mixed were kept for two years a great deal of trouble would be caused by the mice severing the bands of the sheaves.

Mr. F. Norton (Geranium) believed the practice of most farmers was to grow the wheat without considering whether it was to be cut for hay or grain. The better way was to sow those varieties which were best adapted for the purpose when hay was required.

Mr. F. Coleman (Advisory Board) had, during the morning, been driven around part of the district, and he expressed the opinion that if good crops of hay were to be grown it would be necessary to give a somewhat heavier seeding than seemed to be the general rule. Federation was not a hay wheat, but it was decidedly better than Yandilla King. The best of all, perhaps, was White Tuscan; but for an early wheat, King's Early would be found very suitable.

Mr. W. J. Trowbridge (Lameroo) said the experience of the past season had impressed on the farmers the necessity of making ample provision of feed for their horses. The district was undoubtedly capable of yielding sufficient to meet its own requirements; all that was necessary was that the farmers should thoroughly cultivate their land, and use judgment in the selection of the varieties of seed sown.

Mr. F. W. Eime, in replying, said two years ago he had a crop of White Tuscan which was as high as the backs of his horses, and he felt sure this variety was the most suitable for the district. His practice was to sow 1 bush. of seed to the acre.

FARMING IN PINNAROO DISTRICT.

Mr. W. J. Mitchell (Geranium Branch), in an interesting paper, discussed the methods of farming adopted in the Pinnaroo district. The blockholder rolled his mallee, burnt it, put the cultivator or skim plough over it, and then drilled in the seed. The stubble was then burnt and the skim-plough or cultivator again brought into requisition. New mallee land required to be cropped twice to assist in the killing of the shoots, and after the two crops had been taken off, it should be left out for fallow. In all mallee country it was necessary during the first few years to adopt methods of farming that were somewhat loose; when the land was free of shoots and stumps more systematic working would be necessary. Occasionally a farmer was met with who drilled in the seed after a burn, without first working the land. This practice was to be severely deprecated. The skim plough could be used with advantage with the first two crops. This implement would destroy any self-sown wheat or weeds on the land. If harrows and skim-ploughs were used more in this country, and the cultivators used less, better results

would be obtained. In the majority of cases where land was left out for the first fallowing, it was worked with the plough or a disc, and then left until seeding. A disc or other light implement was then put over it. Results of from 12bush. to 20bush. to the acre were secured from land treated in this way during the past season. Wellworked country held the moisture, and there was not a farm in the district which was well worked last year that did not yield a good crop. When it came to fallowing, it was better to work a small area well than to carelessly treat a large stretch of country. There was no reason why every farmer in the district should not grow sufficient hay for his own requirements, vegetables for his household, and keep a flock of sheep on his farm.

THE DISCUSSION.

Mr. M. Neville (Wilkawatt) did not favor the idea of cutting down a large area of scrub the first year. It was better to cut a small area and kill the shoots on it before any more was rolled, otherwise the shoots would get ahead of the landholder and, in addition, where the large area was rolled, a greater strength of horses and more implements were required.

Mr. J. Gray (Parilla Well) considered the area put in should be governed by the capital available. He had put in 900 acres with 11 horses the second year he was in the district. The whole of his block was put under crop the next year. Keeping the shoots under entailed a great amount of work, but now the farm was in fairly good order. When heavy rains were experienced in the summer there would be difficulty in getting a burn to kill the shoots. It would cost more to clear two-year-old shoots than it would to clear the virgin scrub.

Mr. F. J. Dayman (Parrakie) believed in getting the whole area down early. A heavy disc cultivator would cope with the shoots even up to three years old. His plan was to clear as large an area as possible, and fallow any of it that could not be cropped.

Mr. F. Norton (Geranium) thought the shoots were the greatest trouble with which the farmer had to deal. While in the first instance the disc was an excellent implement for use in the district, the mouldboard plough was far superior for fallowing. The rougher they could leave the fallow during the winter the better.

Mr. W. Pannell (Geranium) had about 500 acres fallowed last year. He turned back 120 acres of it a second time, but the portion so treated showed no difference in the crop.

Mr. R. M. Shannon (Parilla Well) had had 200 acres in for five successive years. The first year he cultivated and drilled it, and the return was 7bush. to the acre. The failure was attributed to the bad burn. The second year the stubble was light, and he could not get a fire over it. The disc cultivator was put over the land and the seed drilled in before the rains came, with

the result that he reaped 14bush. to the acre. The third year he burned the stubble and drilled after the rains, and the crop averaged 20bush. The fourth year it was subjected to similar treatment, and 18bush. resulted. Last year, the fifth, a good stubble burn was secured, and the crop, a good portion of which was cut for hay, gave promise of yielding about 14bush. An average annual yield of 14bush. to the acre for five years spoke well for the country. He quite believed that after the first few years it was necessary to adopt a better system of farming in this district than was being carried out in many instances. Deep ploughing, however, would never be necessary in the Pinnaroo district.

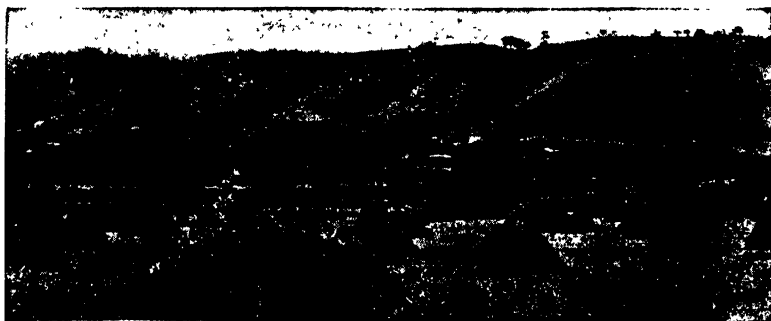
M. F. W. Eime (Lameroo) put in his first crop in 1905 with the aid of a three-furrow plough, without manure, and he reaped 11bush. to the acre. His experience was, however, that it paid to farm well.

Mr. F. W. Trowbridge (Lameroo) believed in getting over as large an area as possible. If the landholder did not burn his scrub, it was quite likely that a fire from some other holding would go through it and he would have the burnt sticks to deal with. The disc plough was very useful in assisting in the destruction of shoots, but its place was not on the cleared farm. Stumps were a great source of trouble, but it was better to have them out of the land than in it. His experience was that where a good stubble burn was obtained there would be little trouble with the shoots. He did not believe in leaving out a large area for feed for stock, preferring to put in rye, or some similar crop, for the purpose.

Mr. W. J. Mitchell (Geranium) in replying, recommended the cutting of shoots in January or February, when the sap was up. They were then more likely to be destroyed.

NEXT CONFERENCE.

It was decided that the next Conference should be held at Pinnaroo, the arrangements being in the hands of the local Branch.



AGRICULTURAL BUREAU REPORTS.

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Arden Vale & Wyacca	*	—	—	Kingscote	*	3	1
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* No report received during the month of August. † Only formal business transacted at the last meeting.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

September 4th, October 9th.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Carrieton, August 22.

(Average annual rainfall, 11½ in.)

PRESENT.—MESSRS. E. W. Radford (chair), M. Manning, F. Williams, F. Vater, J. F. Fisher, W. Beerworth, T. Fuller, J. Ormiston, and J. W. Bock (Hon. Sec.).

FARMING OUTSIDE GOYDER'S LINE.—The Hon. Secretary read the following paper on this subject:—"I have been living and farming in this district for over 32 years, and have found that the conditions obtaining are very different from those in country where they have a much higher rainfall. If the rain falls at the right time of the year in this district, wheat will give a fair return. The greatest trouble is that very often a dry spell sets in about September, and if the rain has been light during the winter months the wheat plant suffers for want of moisture. Science teaches us that we can, to a very great extent, improve matters by cultivation; that is to say, by early fallowing and working the land after every rain. I am very sorry to say that so far very little has been done in this line in the district. As a rule, the fallowing is done too late; the ground is simply ploughed and left as it is turned until next seeding, and then very often put in as quickly as possible in a rough way. According to Campbell's system, the ground must be worked after every rain, and this is the only way to conserve moisture. Some farmers who are living in the Lower North have for years been working their fallow land according to Campbell's system, with extra good results. Lands here, that have been cultivated for some time, are becoming very much infested with all kinds of weeds, and to get rid of them it is essential that the ground should be thoroughly worked. This will cause all weeds to germinate much more quickly than when the soil lies undisturbed. We should fallow our land as early as possible, harrow same, and as soon as the weeds are growing kill them with a good cultivator. Wheat will pay better than sheep on a farm under 2,000 acres in extent." Continuing, he stated that the keeping of dairy cows could be combined with wheat-growing, and poultry would add to the revenue. Only good implements should be purchased, and these should be well cared for. Every farmer was advised to keep a small blacksmith's forge on his place. Members generally remarked that there was a marked improvement in the wheat crops and grass lands in the district of late years.

Coomooroo, August 5.

(Average annual rainfall, 12 in.)

PRESENT.—MESSRS. Berryman (chair), Brown, Brice, Fisher, Cooke, H. and L. Avery, W. and M. Robertson, R. Polden (Hon. Sec.), and five visitors.

UTILISATION OF LAND.—The following paper was read by the acting Hon. Secretary :—“Farmers of late years have been doing much to improve the carrying capacity of their farms, but much more can yet be done in the line of intense cultivation. Land-owners should have up-to-date machinery and good shelter for it. They will profit by keeping the best of horses, cattle, and sheep, but they should not overstock. On farms where irrigation can be practised, the growing of peas will more than pay for the trouble. Farmers should pickle the seed wheat and should sow only the best of graded grain. Care should be taken to select varieties which are most suitable for the district. An adequate quantity of hay for all stock for the following year should be stored, and as much straw and cocky chaff as possible should be also saved for dry years. Paddocks of about 100 to 150 acres are a convenient size for sheep, and they will do much better if frequently changed from paddock to paddock. The experiments of the Roseworthy Agricultural College cannot be too closely observed, and I am sure the benefit the State derives from this college cannot be overestimated.” In the discussion which followed, members generally agreed with the views expressed, and thought that the secret of good wheat-growing was in good cultivation. Farmers could not be too strongly advised to sow only the best of graded seed. One member pointed out the expense of fencing small paddocks, but the majority thought the benefits derived would more than compensate the expense.

Craddock, July 27.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. M. J. McAuley (chair), P. Neylon, M. Neylon, S. Fitzgerald, A. Clarke, H. Lindo, J. Smyth (Hon. Sec.).

ARTIFICIAL MANURES.—Mr. Fitzgerald had for some time been making experiments with the idea of ascertaining the improvement in crops following the use of different manures, but his experience was that applications made no difference whatever, either in the growth of the plant or yield of wheat. He was of the opinion that there was something wanting in the manures to suit northern soils. [A plan of the experiments would be of great interest. Were the plots carefully measured and the returns weighed to calculate the value of each? An increased yield of a bushel or two per acre cannot be seen in the field, but will often pay handsomely for the extra manure.—ED.]

CO-OPERATIVE SHEEP SHEARING.—The Hon. Secretary read a paper in which he advocated the co-operative shearing of small flocks of sheep. The advantages derived from this system were pointed out, and an interesting discussion followed. Mr. Fitzgerald was of the opinion that if a number of settlers in the district were to combine and erect a shed at a suitable centre, considerable good would follow.

Hookina, August 3.

PRESENT.—Messrs. S. Stone (chair), B. Murphy, P. and T. Kelly, L. Woods, J. Henschke, D. Madigan, and one visitor.

POULTRY ON THE FARM.—Mr. P. Kelly read a short paper on this subject, in the course of which he stated that no farm should be without a number of laying hens. His experience went to prove that the White Leghorn was the most suitable breed for the district. The farmer was well-advised to procure sittings of eggs from those breeders whose strains were successful in the egg-laying competition. The majority of members agreed with the writer of the paper that the White Leghorn was the best breed to keep, but Mr. T. Kelly favored the Minorca, and Mr. B. Murphy preferred the Plymouth Rock.

Morchard, July 27.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. W. Toop (chair), R. Jasper, W. Munro, G. Richards, B. S. McCallum (Hon. Sec.), and three visitors.

CARE AND MANAGEMENT OF HORSES.—The following paper was read by Mr. G. Richards :—“Considering that horses are the means by which the farmer obtains his livelihood, he should not mind going to a small expense to provide for his horses' comfort. First and foremost is the provision of a good stable. I believe in a stone stable. As to the roof, different farmers have different ideas. Some prefer straw and others iron.

If I were building I would roof with Wunderlich tiles. These are very little dearer than iron; they are waterproof, have an attractive appearance, and are not loosened by the wind as iron is. They are also warm in winter and cool in summer. The objection most farmers have to iron is that it is hot in the summer time. The best way to keep a stable with an iron roof cool is to ceil it with metal ceiling, and leave a space of, say, 5in. or 6in. between the roof and the ceiling. If this is done, and it is left open, a draught will be caused, and the stable will be found to be always cool. Each horse should have a separate stall; 5ft. is ample width for each. The partitions between the stalls should be made of sufficient height to prevent horses biting one another. At one end there should be a fairly large loosebox. This will be found very useful in which to keep a sick horse. When a horse shows signs of illness, attend to it immediately. A dose of medicine given in the early stages of a malady or disease will sometimes save time and money, and perhaps the horse's life. A medicine-chest should be kept in every stable, as it is too late to go away and buy medicine when the horse is ill. Horses should be well groomed at least once a day, twice, if possible. I once heard it remarked that a horse did not need grooming, because in its wild state it was never groomed. My argument is that a horse in its wild state is never worked and made to sweat, therefore, it does not need grooming; whereas, a working horse's coat becomes caked with sweat and dust. Horses should be supplied with well-fitting harness, which should be kept well oiled, as it is then more comfortable for the horse. Horses should be fed on short feed in preference to long hay. I believe that molasses is one of the best things that a horse can be given when there is no green feed obtainable; it acts as a laxative and also as a tonic to the system. Nearly all the sickness that has been so prevalent during the past two or three months is due to no other cause than want of green feed. A half-starved foal will never make the horse that a well-fed foal will. When breaking in a young horse, never break it down. A horse will prove a more apt pupil if treated firmly but kindly than if it is beaten and knocked about. A horse is like a human being. When a child goes to school for the first time it is not expected to do the same work as a child that has been going several years, but it must be taught little by little. A young horse is the same when it is put in a team for the first time. I believe every young horse should be mouthed and taught to guide before being put in a team. A chain bit coated with rubber is the best bit for mouthing a colt. It can champ this without injuring its mouth. If a horse thinks you are frightened of it, it will try to master you." In discussing the subject, the majority of members agreed that it was necessary to provide suitable stable accommodation for horses.

Quorn, July 27.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. R. Thompson (chair), Schulze, Bury, Noll, Cook, Finley, and Patten (Hon. Sec.).

FOXES.—The following paper was read by Mr. Noll:—"Foxes are becoming very numerous, and as they are great thieves of poultry, and will destroy lambs and even weak sheep, they are a great nuisance. The following method of destroying this pest has been tried by a large number of sheepowners and others with marked success:—A number of pieces of bait of sheep's or rabbit's liver, suet, birds of any description, or fish should be obtained, and as much strychnine as may be lifted on the point of a pocket-knife should be placed in each bait. A lesser quantity will kill, but not immediately. Having prepared the bait, wrap it in paper if it is your intention to carry it on horseback. For a drag or trail, sheep's entrails, skinned rabbit, or a stale head will do. The evening is the best time to lay the trail, as the scent will remain about all night. Keep on the open country, and at marked places drop or bury a bait every 300yds. The baits should not be touched with the hand. Any fox coming on the trail will follow it up, and will be found dead within a short distance of the spot where the bait is laid. I prefer birds as baits, as there is not so much danger of poisoning domestic dogs, because they will not touch birds."

Warcowie, August 17.

(Average annual rainfall, 11·94in.)

PRESENT.—Messrs. T. Donnellan (chair), A. Bairstow, W. and W. E. Sanders, C. Jarvis, P. and J. Duffy, Taylor, Bennett, J. Feineler (Hon. Sec.), and eight visitors.

METHODS OF CULTIVATION.—A discussion took place on the most suitable methods of cultivation for this district. Mr. Telfer thought it a good plan to lightly work the ground

intended for fallow, either during the summer or early in June. Weeds would then grow, and the ground would be in good order for fallowing. It should then be harrowed, and re-harrowed after each rain during the summer, in order to conserve the moisture. Members generally concurred.

Wepowie, July 30.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. J. Crocker (chair), C. Halliday, J. Orrock, G. Roocke, C. Pearce, C. Knauerhase, M. Irvine, J. Chrystall, and one visitor.

TREE-PLANTING.—Mr. C. Knauerhase read the following paper:—"It must be admitted that tree-planting is very much neglected, and whilst the settlers might not at present feel the consequences of their neglect, they will do so in years to come. There will be a shortage of firewood and timber supplies, and shelter in paddocks for horses and stock. Farmers will discover room for hundreds of trees around their holdings on some of the stony land, or in between stone reefs. A clump of sugargums, which are the hardiest of trees, and which will grow where many others fail, should be planted. Around the house also trees should be planted; first a row of the common erect cypress, about 4ft. apart; then two rows of sugargums, 10ft. apart; and on the outside a row of Remarkable pines, 8ft. apart. This will make an excellent windbreak. A few rows of pepper trees and sugargums around the implement sheds and yards will provide excellent shelter. Not only will the trees beautify the homesteads, but they will add value to the property. When preparing for planting, fallow and cultivate the land just as is done for a wheat crop."

Willowie, July 23.

PRESENT.—Messrs. T. Hawke (chair), E. S. Bristow, B. E. Schmidt, A. Stone, J. McCallum, S. C. Greig, and W. P. Foulis (Hon. Sec.).

FARM HORSES FOR THE WILLOWIE DISTRICT.—The following paper was read by Mr. W. P. Foulis:—"In opening a paper on this subject, in the first place we should take into consideration the conditions that obtain here. Our district principally consists of level plain that is moderately easily worked. It is subject to drought, and to years when there is an abundance of green feed in the paddocks. The weather is exceedingly changeable, varying from extreme heat to bitter cold in a very short time. In describing a horse suitable for this district I recognise that it must be one that will breed true to type. Some favor a horse bred from a light mare and a heavy draught stallion. This would necessitate the farmer keeping mares which were not the most suitable. Before confining myself to any particular breed, I will give a few characteristics which, if possessed by any horse, make him suitable for farm work, irrespective of breed. The horse should be what we term a 'good doer,' and a fast walker. These qualities are usually found in an animal possessing the following characteristics:—Compact build, round barrel, well ribbed up, short back, good sloping shoulder, wide and strong across the loins, broad deep chest, moderate to short leg, with clean, strong joints, with plenty of strong, shapely, well-developed muscle, and moderate sized flat bone. I favor the medium draught; not the class termed medium in the saleyards, but that a size or two below our very heavy draughts. They thrive on very much less feed than the heavy draughts, and as a rule travel much faster. In nine cases out of ten the smaller horse will be found in the lead of a team, with the heavy ones in the body. It is easier to breed the medium draught true to the standard I have set than is the case with the heavy draught. The majority of heavy draughts are loosely built, and have a tendency to slab sides and a long back. They are not fast movers, and their own weight is often a burden. They are not nearly so healthy, and cannot stand the strain of fast travelling so well. In a time of drought the medium horse will be found much more profitable. Some will urge that the heavy mare will rear a more profitable foal should the owner wish to sell. Considering the price obtained for the foal only, this may be correct. If sold before three years of age the foal from the medium mare will hold its own; after that age the foal from the heavy mare will probably have the advantage. The price obtained for the foal is not the only consideration. I have lately carefully observed brood mares, and in nearly every case I have noticed that the heavy mares are comparatively poor, whilst the mediums are in better condition. The offspring of the latter are also in better condition. Of course there are exceptions to all rules. For breeding foals for sale I favor mating the medium mares to a heavy draught stallion. It will be found that they will travel faster while carrying the foal, and will work nearer to the time of foaling than the heavier mares.

They will do more work whilst suckling the foal, and do not require nearly so much feed to keep them in condition. A good foal is obtained from the medium mares if mated to a heavy stallion, for it is a well-known fact that the impress of the sire is noticed to a greater degree in the offspring than is the case with the dam. In breeding for farm work, observe the characteristics I have mentioned, and if any are lacking in the mares, see that these are very strong points in the horse. Mate the leggy mares with small barrels to a short-legged large-bodied horse, and low-set mares to a more upstanding horse. Of the various known breeds I favor the Clydesdale of moderate size. This class is exceedingly active, strong, and sound, thrives well, can be depended upon to pull when required, is tractable, and very handsome. In brief, the ideal farm horse is a moderate sized Clydesdale of compact build, round barrel, well ribbed up, good square hind quarters, moderate to short, strong and powerful, yet not with over heavy legs, a fast mover, of good, even temper. It will be noticed that I have mentioned only the heavy and medium draughts. They are the only animals worthy of consideration. The smaller horses and mongrel class contain many splendid animals, and as a whole are a cheap, useful horse for any one commencing farming, but when considering the most suitable horse for the district they are not worthy of discussion. We all admire a uniform class of horse on a farm, and what single class could do the various duties of the farm horse better than the stamp I have described? They can do wagon, van, springdray, plough, harvester, and drill work, and can rear a valuable foal. To make this paper as practical as possible, I will give some measurements of two horses which possess most of the characteristics I have mentioned. The first are those of a four-year-old filly, and are—Height, 15½ hands; girth, 6ft. 5in.; forearm, 23in.; fore cannon, 9in. This filly has good broad square fore and hind quarters, and is, though on the light side, a good class of farm horse. It would be necessary to mate a mare of this stamp to a moderately low-set nuggely stallion. The others are those of a matured horse, and are—Height, 16 hands; girth 6ft. 9in.; forearm, 23in.; cannon, 10in. This stamp of horse is quite heavy enough for our heaviest farm work. As regards hair, I like a fair quantity. It does not help or hinder a horse in his work, but it improves his appearance and is a great advantage when he is put on the market." In discussing the subject Mr. Hawke said the Clydesdale was undoubtedly the most suitable stamp of horse. No other was so handsome, and activity was characteristic of the breed. Mr. Bristow agreed with the paper. Some thought it a mistake to trot draught stallions, but he believed it did them good, and they should be trotted. Plenty of hair on a horse was an advantage when selling. Mr. B. E. Schmidt said many of the big horses about were the offspring of small stallions, and were clumsy and not true types. Large horses bred from large stock were far more active. It required fewer big horses than smaller ones to do a certain amount of work, but they ate more per horse. He favored the type of horse outlined in the paper. It was weight of body more than size of leg that was required.

Wirrabara, July 27.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. E. J. Stevens (chair), P. Lawson, C. F. H. Borgas, C. Hollett, W. H. Stevens, A. E. Stott, W. Bowman, E. Hollett, S. Thiselton, J. Hollett, C. H. Curnow, W. Marner, J. F. Pitman, P. J. Curnow, A. R. Woodlands (Hon. Sec.).

BROAD BEANS.—In reply to a question, the Hon. Secretary said that broad beans should be sown in good soil early in February, and copiously watered through the spring. Other varieties, such as French beans, should be sown late in spring, and supplied with plenty of water until they reached maturity. He strongly recommended Burpee's Bush Climber for use as haricots.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, July 22.

PRESENT.—Messrs. A. H. Jacobie (chair), Bartrum, Thyer, Ryan, Bartrum (Hon. Sec.).
GROWING AND STACKING HAY.—The following paper was read by the Hon. Secretary :
—"In dealing with this subject no hard and fast rule can be laid down, as varieties of

wheat which are a success in one district are not always profitable in others. The best wheat for home use in this district is Marshall's No. 3, as it does exceedingly well. For sale purposes I would advise growing King's Early, as this variety is a tall grower, and is about the heaviest hay wheat available. The best time to cut wheaten hay is just after the flower has fallen. The straw will then be white for about 3in. above the bottom knots. This will leave the first part of the stem a bright golden yellow, the balance being a dark green, and sufficient grain will be found in the head. If the area to be dealt with is large, in the last portion of crop cut the grain will be found well advanced. Thus the grower secures both weight and color. To obtain the highest market price hay should be dealt with in this way, and stooked immediately after it has been cut, so that it will keep its color. The greener we can keep the hay the better it will be for market, for as long as the chaff is a good color it will return top price. I have seen beautiful chaff which had been cut on the ripe side condemned, although the grain was nice and plump, whereas with the green hay you would only find a few shrivelled grains. The first mentioned is worth 10s. or 15s. a ton more than the latter, in my opinion; but buyers do not consider this, and will take color before grain every time. Hay cut too green is liable to scour the stock, but when cut at the proper time there is no danger of this. Some farmers prefer oaten hay to wheaten, but I do not consider it to be nearly as good. Oats have to be left till nearly ripe before being cut. If they are cut green the hay is bitter, and stock will not eat it. The argument in favor of oats is the corn for feeding purposes; but I consider what is gained in corn is lost in the straw. The great secret in cutting good hay is to see that the machines are in thorough working order. Cutting should be commenced a day too soon rather than two days late, as is often the case. A hot windy day at the time of the year when the crop is ready to cut will take 4cwts. or 5cwts. to the acre out of it. Hay land should be rolled, as it can then be cut close and the yield per acre considerably increased. For quick carting I prefer the stooks four sheaves deep, two in the centre, and one on either side, bringing the heads to a sloping position. This will stand a heavy fall of rain without damage. To make a success of this method it must be done with the hands. The two end sheaves must be well closed in, to prevent the wind overturning them. When the hay has to remain in the fields for a time, the round stooks are preferable, but care must be taken not to make them too large, or in case of rain a greater portion of the middle sheaves will go black, as the air cannot get at them. Stacking can be started 12 or 14 days after cutting. This, of course, depends on the weather at the time of cutting. If the cutting is done in hot, windy weather, the hay will be ready for carting much sooner than that cut in mild, damp weather. We are, of course, all anxious to get it into the stack as soon as possible, but often tons of hay are spoilt through being stacked too soon. All stacks should be placed on a good bed of straw, of about 1ft. or 18in. deep. Sheaves should be placed butt out, keeping the middle about 3ft. above the sides. This will give the sheaf a good dip, so that the rain will not run into the middle of the stack. I believe in stacking with the fork. Some stack the first two or three rows with the hands, and then fill in the middle with the fork. The difficulty with this is that the stack does not settle evenly, thus allowing the rain to run into the centre. All stacks should have a good covering of straw, either loose or in sheaves, if put on properly. A little time and trouble expended in this way will pay for itself thrice over during a wet winter." In discussing the subject Mr. Ryan said dunnage was better than straw for putting under a stack, as less loss was experienced with the former. The dunnage could also be used for a number of years. Gärten oats were the best for hay. The majority of members thought oaten hay preferable to wheaten, so long as it was fed as chaff; but it was usually too coarse to be fed long.

Beetaloo Valley, August 22.

PRESENT.—MRS. A. H. Jacobie (chair), Bartrum, Ryan, Woolford, Burton, Curtin, C. Cox, F. Bartrum (Hon. Sec.), and one visitor.

CAPABILITIES OF THE DISTRICT.—This subject was dealt with in a paper by Mr. J. Burton, in which he stated that when the land in the district was cleared of stone and timber good crops of wheat could be grown. Barley and oats were also to be profitably cultivated, and malting varieties of the former were being tried and gave every indication of success. Lucerne did not receive due attention. The carting of firewood and burning of lime were profitable side lines to which the farmer could direct his attention. Apiculture was making headway, and the cultivation of apples, oranges, peaches, apricots, and nectarines was going ahead by leaps and bounds. There was a large area of land suitable for currant growing, and no doubt this would be utilised eventually. Members generally agreed with the ideas expressed in the paper.

Crystal Brook, July 27.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. M. P. Pavy (chair), W. J. Venning, R. R. Shaw, J. Pridham, B. Flavel, G. Miell, R. Heaslip, J. Teakle, G. A. Solomon, G. and V. H. Sargent, W. Jasper, W. Hutchison, H. Billingham, W. Carmichael, J. Forgan, W. W. Lovelock, T. L. Kelly, R. Pavy, B. Weston, G. Davidson, J. Duffield, E. and W. W. Robinson (Hon. Sec.).

SUCCESS IN FARMING.—Mr. J. Teakle read the following paper on this subject:—

“If we are to make farming pay, we must look to it as a business man looks after his business. It depends very largely on the man himself. We will not find two men who work exactly alike, yet we can and we do take lessons from one another. One of the most important items connected with farming is fallow. Where it can be done, I like to start summer ploughing. On the Gulgare Plains this year several hundreds of acres were ploughed up before seeding. As soon as we have finished tilling we should put the cultivator over the land, and the more work it gets the better. It does not do to work it dry, however. I have noticed that summer fallow turns out well during dry seasons. I am a strong believer in the harrows. I contend that they give the cultivator a better chance. When fallowing it is not wise to plough too deeply; 4in. to 5in. is enough, whether it is ploughed before or after seeding. I almost spoil a piece of land on one occasion by ploughing it too deeply. It was a piece of sandy land with a clay bottom. I turned the clay up on top. I found that this land needed different treatment from the heavy land. I do not think we can get the heavy land too firm, and the looser we can keep the other the better. To grow crops we must fallow, and the earlier the better. Put all the work possible into it. Every farmer should raise his own horses. We have a good selection to choose from now, and it costs no more to keep a good horse than a poor one. It is very gratifying to see how we have got our stock to such perfection, and we ought to get the best to suit our taste. My own fancy horse is the Clydesdale. I have sold two young stallions of this breed from a good roomy mare, and they are doing splendidly to-day. To make a success of farming the best wheats must be grown. For hay purposes we cannot do better than sow Gluyas, King's Early, Marshall's No. 3, and Majestic. I believe the farmers in this district grow Carmichael's Eclipse extensively for wheat. I have found in the Gulgare district that Federation has been the most prolific. It is difficult to say which is the best, but we should select the best, and have it clean. It is a good plan to change the seed for some from another district. It does not pay to plant one variety only. Sheep are of immense benefit to the farmer. I like a good Merino ewe, 6-tooth to a full mouth, for lamb-raising purposes. It is a great mistake to overstock. The most profitable lamb to me has been the crossbred. With 100 good Merino ewes and two Lincoln rams the results should be satisfactory. Some prefer the Shropshire, but both the crossbred and the Shropshire lambs are difficult to keep inside the fences. If we can grow a lamb fit for market in five months and get 10s. for it, it pays well, and every farmer should grow his own meat. Sheep help to keep the fallow clean. A flock of sheep on a farm pays better than too many horses. Whatever the breed of sheep kept, keep the best, as they cost no more. It is not profitable to keep a lot of cows when we have sheep. Two good cows are sufficient; but of course it depends on the extent of the farm. Phosphates have played an important part in our success as producers and tillers of the soil. They are especially helpful during the winter, when they act as a feeder to the plants. Whilst the phosphates force the plant, there is a danger of the hay becoming less sweet, and if they affect the hay, I fancy they must also affect the flour. I believe in growing oats for the horses, and have had some fine crops of stubble land. Oats do not take so much strength out of the land as is the case with wheat. I prefer the Algerian, as they are the most hardy, especially in land subject to takeall. Fowls are also a good paying stock, and I believe with proper management we can have eggs all the year round. Whilst our success in farming depends largely upon ourselves, we must not lose sight of the fact that we also depend on somebody to buy our products. We may have the best land and make every necessary provision, but we must have the rain.” Mr. Heaslip, in discussing the paper, said the depth to fallow depended on the class of soil, some soils allowing of deeper ploughing than others. It was inadvisable to bring a clayey subsoil to the surface. The best variety of wheat to grow differed in different districts, and a wheat which was a success in one district was frequently practically a failure under other climatic conditions. With an early season lamb-raising was very profitable, but when feed was late the opposite was the case. He agreed with the writer that the Clydesdale breed of horses was the most suitable for farm work. Mr. Venning agreed that harrowing was not carried out as much as it should be. Summer fallowing was all right providing the land contained sufficient moisture to enable it to be done properly. The depth of fallow depended upon the class of soil

under cultivation. From his experience, and also on the authority of such old identities as Messrs. Binney and Pavy, he would recommend shallow rather than deep fallowing in this district. He had found the most profitable horse to breed was the short animal, which would do a lot of work and not eat too much. Mr. Flavel considered that 4in. or 5in. deep was sufficient to plough for this district. Summer fallowing had been tried by Mr. Nicholls, who had not found it a success. Mr. Pavy said if summer fallow meant ploughing the land dry, he was opposed to it. When he first came to the North he was in favor of deep ploughing. He ploughed a piece of land to a depth of 7in., and it proved a complete failure as compared with land worked shallower. The most suitable horse for farm work in his opinion was the cross of the roadster with the Clydesdale. Mr. Birks was strongly in favor of fallowing, which could not be done too early. If one could not get on with seeding operations he would advise fallowing as much as possible. He favored the Clydesdale as an all-round horse. The depth of ploughing could best be gauged by experience. Mr. Shearer had found that super. returned good results in the drier districts. Federation wheat had proved a failure, so far as his experience had gone. It was subject to all the diseases by which wheat was attacked.

Gladstone, August 24.

PRESENT.—Messrs. R. E. Lines (chair), J. H. Sargent, W. Brayley, W. Sargent, P. Sampson, T. Mutter, F. Mutter, R. Peters, J. Connolly, T. Brown, G. Black, B. Smalla-combe, E. Davies, S. Masters, R. Coe, J. Eley, G. Fisher, J. Fisher, A. E. Dinning (Hon. Sec.), and six visitors.

PREPARATIONS FOR SEEDING.—In a paper on this subject Mr. J. H. Sargent said fallowing should be begun as soon as possible after seeding was finished. The depth of ploughing necessary was from 3in. to 4in., but where red land was being treated from 4in. to 5in. was advisable. Shallow ploughing kept the moisture nearer the surface and did not take so much working down as was the case with deeper ploughing. All the fallowing should be completed by the end of August, and it should then be harrowed immediately. While it was necessary to do the work as expeditiously as possible, working when the ground was too wet resulted in its being bogged, and working when too dry was responsible for a lumpy upturn. The cultivator could be used for destroying weeds in October, but during the summer months the fallow should not be touched. May was the best month for seeding, but sowing should not be attempted before a fall of rain, and the cultivator should precede the drill over the land. One inch was plenty deep enough to bury the seed. After the drilling fallowing with light harrows was advisable, but not before rain, as there was a danger of causing the seed to malt. Attention was drawn to the fact that various manures applied by South Australian farmers did not in all cases suit the particular class of soil, and knowledge of the constituents of the manures was essential to the agriculturist. A good discussion followed. Mr. Lines favored deep sowing, as it protected the seed and brought it to maturity better. Mr. Peters thought the depth of sowing depended on the season. Mr. Sargent said that wheat could be advantageously harrowed for some time after germination. Several members recommended the use of different manures in successive seasons. The soil could be overfed in the particular constituents supplied by one kind of manure. In reply to Mr. T. Mutter, who considered summer fallowing was advantageous, Mr. Sargent advocated leaving the land untouched in summer and finishing all fallowing by the end of August.

Leighton, July 25.

PRESENT.—Messrs. T. Goodridge (chair), J. Hogan, M. Hogan, G. Pryde, R. McWaters, R. Fairchild, J. Goodridge, A. E. McWaters (Hon. Sec.), and five visitors.

TELLING THE AGE OF THE HORSE.—The following paper was read by the Hon. Secretary:—"Though it is quite common to meet men who profess to be able to tell accurately the age of horses up to a late period in life, nevertheless it is safest for a person not to claim to be able to read a horse's age with accuracy after the animal has passed eight years or so. I do not propose to deal with the construction of the teeth, but to deal briefly with the general arrangement of the teeth, and the ages at which they appear, which, in the case of milk teeth, are shed and replaced by others. A foal at birth has three molars or grinding teeth just through the gums on both sides of the upper and lower jaws. It generally has no incisors or front teeth, but the gums are inflamed, and evidently

upon the eve of bursting. The molars, or grinders, are as yet unflattened. Between one and two weeks old the four central milk teeth appear. At six weeks old the two pairs of laterals appear; the foal has now 20 teeth. At six months the front edges of the centrals and laterals are worn level. At nine months old the four corner milk teeth are through, and the foal has 24 milk teeth. At one year old the first permanent teeth appear. These are the fourth molars or grinders, and the colt will have 24 milk teeth and four grinders. At 16 months, the edges of the milk incisors are level, and those of the top jaw are in contact with those of the lower jaw. At 20 months the fifth permanent molars, four in number, are through. The colt has now eight permanent molars and 24 milk teeth. At two years the corner incisors have lost their marks. At two and a half years the colt sheds his four central incisors, and these are replaced by four permanent incisors. At this period he also sheds eight milk molars, the first and second molars of both jaws, which are replaced by others. At three years the middle centrals are in wear. At three and a half years he sheds his laterals, and also the third molars. At four years the laterals are up level, and the sixth permanent molars are through. The colt has now 24 permanent molars, eight permanent incisors, and four corner milk incisors. Also the tusks generally appear at this stage. At four and a half years he sheds his corner incisors, and they are replaced by permanent incisors. At five his teeth are all level. At six the cups are large in the corner teeth of the lower jaw, small in the lateral teeth, and still smaller in centrals. At seven years the cups leave the central teeth and at eight years old the cups leave the laterals. When the animal reaches the age of nine years, the cups leave the corner teeth, and at 10 years a dark groove will appear in the centre of the corner tooth of the upper jaw. At 15 the dark groove will be half-way down the tooth, and at 20 it will be to the bottom."

Mount Bryan, July 29.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Tralaggan (chair), Wardle, Hatherly, Schmidt, E. K. Collins Stewart, Nutt, H. L. Hatherly (Hon. Sec.), and one visitor.

CARE OF FARM IMPLEMENTS.—In a paper on this subject the Hon. Secretary said that it was unnecessary to remind the careful farmer that implements for which high prices were paid should receive due attention; but still the carelessness of some in this regard was astonishing. Machines such as strippers, harvesters, binders, &c., should receive a good coat of paint at least once in two years. This not only improved the look of the machine, but preserved the wood and prevented it warping and cracking. For an implement shed stone walls and an iron roof were most serviceable, and there was less danger of fire than was the case where thatched sheds were used. As soon as an implement was finished with for the season, it should be thoroughly cleaned and overhauled, and then put away. Fowls should be kept out of the implement shed.

Port Germein, July 6.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. Carmichael (chair), Hacket, Head, Hillam, Stone, Teasdale, Crittenden, Glasson, Blesing, and Turner.

NOXIOUS WEEDS.—The following paper was read by Mr. Hillam:—"The Advisory Board of Agriculture has recommended that the Government take drastic measures to enforce the Noxious Weeds Act, that landholders be compelled to destroy all noxious weeds, and that the administration of legislation be taken out of the hands of district councils. I would like to point out a few facts that probably the general public, more especially southern landholders, are not aware of. Many weeds now classed as noxious, and placed on the list by past Governments through representations from well-meaning but inexperienced and untravelled persons, are not noxious by any means. No weed that stock will live and thrive on should be classed as universally noxious. The Balaklava Branch claims that Salvation Jane, wild turnip, stinkwort, artichoke, and wild onion are noxious; but I cannot agree, as most are fodder plants, and the first-named a good one. Stinkwort in certain stages of its growth is not good, but, like artichoke, comes in very useful at certain times of the year. The ordinary or so-called star thistle, which is not the true star thistle, is classed as noxious by many, and by others as good feed for sheep. It is growing over a great extent of this State and also many of the other States of the

Commonwealth, and the question comes in, is it practicable or possible to eradicate the star thistle, as well as many other weeds classed as noxious under the Act? It would appear to most thinking people that before the Government take the drastic measures proposed they should first find out from persons best qualified to judge if it is really practicable or possible to eradicate them. The trouble is that the star thistle, like many other weeds, was allowed to spread all over the State before being placed on the list. It starts to grow early in the winter, and it is difficult to see until it runs up to flower. Before the district council can give the necessary notice the plant is in flower, and the seeds will mature, and if cut, grow. Many landholders do their best to keep them from seeding, but if the season suits the growth of the plant many will seed and come again as soon as conditions are favorable; and the consequence is landholders when summoned, knowing the impossibility of eradicating the weed, pay the fine as the only way out of the difficulty. The northern councils are well-stocked with star thistle from what can be termed waste lands of the Crown, viz., pastoral leases and travelling stock routes in the northern part of the State, some portions of which are still out of district council areas. The result is that travelling stock carried the seeds from north to south right through the State, and floodwaters carried the seeds from stock tracks east, west, north, and south. If the Government carry out the measures proposed the result will be that all waste lands of the Crown, including travelling stock routes, will be handed back to the Government control, whose duty it will then be to exterminate the noxious weeds. I claim, from personal knowledge of the country and the efforts put forward both by private landholders and district councils, that it is waste of time and money to attempt to eradicate the star thistle and many other weeds gazetted as noxious; and I venture to say if the measures now proposed are given effect to it will spell ruin to hundreds of landholders, who, through no fault of their own, have noxious weeds, especially star thistle, growing on their land. In concluding these remarks, I would suggest that the Government retain a portion of their rough repurchased land infested with star thistle and try the experiment, and keep an account of the cost of eradicating the thistle before taking the extreme measures now proposed." Members unanimously agreed that the star thistle was a great nuisance, but it was utterly impossible to eradicate it, especially in stony and hilly country. It was suggested that before any drastic action was taken the Government should experiment on a rough and infected piece of country.

Port Germein, August 9.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Carmichael (chair), Crittenden, Head, McDougall, Hacket, Holman, Deer, Hillam, Stone, Glasson, Blessing, Turner, and Stock (Hon. Sec.).

IRRIGATION IN HUNDREDS OF BAROOTA AND TELOWIE.—The following paper was read by Mr. Hacket:—"Not being an expert in this matter it is with diffidence I approach it; but, from seeing the benefit that follows a flood high enough to inundate the surrounding country, it appears to me that a discussion on the possible utilisation of waters situate from 500ft. to 1,000ft. higher than the ground level here might not prove altogether unprofitable. Starting first with Baroota Creek. My opinion is that 500 acres could easily be irrigated from its surplus waters by giving water to different users at alternate seasons. For instance, one landholder could have water this year in summer and in autumn next year, and so on, the one getting the summer supply to receive a greater amount. This would apply to the lower stream. I would say that one-third or one-half of the water-fall's supply diverted ought to give enough water to irrigate blocks of 30 acres for gardens on the foothill slopes. Next in importance comes Boek Creek. Though not nearly so large as Baroota Creek, it would irrigate nearly, if not quite, as much land owing to its greater fall and swifter flow. I am going on the assumption that, say, 12in. of water put on the land at any season of the year is payable. Next comes Telowie Creek. Although it is reputed to be an indifferent supply, a considerable amount of land could be irrigated from it; enough to at least on each farm provide fodder to mitigate in some considerable measure the severity of seasons such as we have just passed through. Broad Creek could also be utilised; and I believe the tapping of both it and Telowie Creek would go to show that the drain on them would improve the quantity of the flow. The only expense ought to be for pipes, as all the waters are high enough to be economically tapped without costly and elaborate head works. I notice that the Victorian compulsory rate is 5s. per acre per annum for one acre foot of water, and I fancy their irrigation works are on a costly scale. I can see no reason why the modest outlay needed here should not, on the same terms, be much more remunerative to the owners of the works. I note one who travelled

through 12 States in America, declared that 10 of them owed their prosperity to irrigation, and also recorded his conviction that the Darling River alone, if used for irrigating, would support all the stock in Australasia. I am convinced that irrigation, on however small a scale, must prove to be a profitable investment." In discussing the subject members generally agreed that beneficial results would follow the damming of the floodwaters referred to, but the spring water was too highly charged with mineral substances to be of much value for irrigation.

BREAKING FARM HORSES.—Mr. Stone contributed the following paper:—"In such a country as South Australia, where farm horses play such an important part, a little may be said about the breaking in of the young draught animal. Most of us have some old-fashioned way of our own, but at the same time there are new methods and ideas that often come useful when handling a young horse. First of all, I would not advise breaking before the animal is about three years of age, as when broken too young the youngster is often broken down. The best time is between August and November, while the green feed is about. When the colt is run in to be caught it is not necessary to get into the yard with about 60ft. or 100ft. of rope. I find a crush pen very handy (or a narrow stall will answer the same purpose), as one can run the colt in and get alongside it quietly; then a headstall can be worked on and a bit put on with two small straps. A surcingle or leather roller should next be placed on and a rein fixed from the bit on to the roller on both sides. The colt may then be let out into a yard for a few hours, after which it may be unharnessed and left until the following day. The next point should be to teach it to lead, which may be managed by placing reins through the two rings of the bit, with a loop left long enough to go around the animal's hindquarters. A knot should be placed in the rope, just behind the animal's wither, then the person leading should pull lightly on the rein on the side on which the animal may happen to have its hind leg extended backwards. Some will lead very quickly by this method. If by this time the animal seems to be of a quiet nature, it may be placed between two quiet horses, and if no trouble is experienced with it here it may be considered fit for the team."

Port Pirie, August 8.

(Average annual rainfall, 12½ in.)

PRESENT.—MESSRS. J. Greig (chair), T. B. Jose, E. J. Eagle, C. E. Birks, H. F. Richter, H. G. Hawkins, W. Munday, D. L. McEwin, T. Johns, F. A. Johns, A. M. Lawrie, H. Lawrie, A. Bond, W. R. Wright (Hon. Sec.), and one visitor.

LICE ON SHEEP.—Mr. Birks, in referring to lice on sheep, said that it was likely to become a serious matter with sheepowners. The trouble was largely due to the distribution of lice-infected rams throughout the country. If the rams were dipped before being sold in Adelaide it would be to some extent minimised. Mr. Munday thought it somewhat of a hardship to compel owners of clean flocks to go to the trouble and expense of dipping their sheep. Mr. Hawkins moved—"That this meeting is desirous that stringent measures be taken to prevent the spread of stock pests, such as lice, tick, &c., and that all rams be dipped before being distributed throughout the country." Mr. T. Johns seconded the motion, which was unanimously carried.

CARE AND BREAKING OF HORSES.—The following paper was read by Mr. A. M. Lawrie:—"It is the farmer's duty to see that everything possible is done for the care and benefit of his stock. Horses should have a good, warm, clean stable, with a fair-sized yard. They should be fed regularly when there are not sufficient natural grasses for them. It is a bad plan to put more chaff in the manger or feed-box than will be readily eaten up. Any left soon becomes sour, and, if eaten, is injurious to the horses. The water-trough should be placed so that the horses can drink when they choose. Each horse should have its own harness, and the collars and hames should fit properly. Horses should be groomed at least once a day. A colt should be from two to three years old before it is handled. I prefer to rope them as quietly as possible in the yard. Let the colt see that you are master, and get on friendly terms as soon as possible. As soon as the animal will guide properly, put the harness on and hitch it on to a log and drive it around for a while. Then put it between a couple of quiet horses, after which it can be put straight into the harrows, or any other light working implement. Colts should not be worked long at a time for the first few days until the shoulders get set." Mr. T. Johns was not in favor of horses being allowed free access to the water trough, and did not believe in hooking a colt to a log, as there was a liability of the animal being ruined by an accident. Mr. Munday

said that roomy yards were to be seen on many farms, but clean stables seldom. It would pay to erect an extra stable for the purpose of having a dry place for the horses to lie down in at night. Horses should be allowed to drink whenever they felt inclined, no matter whether they were hot or cold. Foals should not be petted when young; they were better left alone until they were "handled." There was a possibility of injuring a colt by harnessing it to a log. Mr. Richter favored having the water trough placed some distance away from the yard. He would not put a colt in a breast team to teach it to pull, as it generally expected the other horses to pull for it. A good plan was to place a set of single harness on the colt and fix the breeching straps to the collar or traces, so that the weight of the collar could be felt on the shoulders. Mr. Eagle's horses had always been allowed access to the water trough in the yard; by having it there much trouble was saved in taking the horses to water. Mr. F. A. Johns would have the trough in an outside yard, away from the stable. There was a danger in putting a colt in a breast team at first, and it should be well handled before being hitched to a log. Mr. Hawkins generally put his young horses straight into the team and let them take their chance. Mr. H. Lawrie did not like the idea of making a colt haul a log about. He generally considered the animal broken in when he put the blinkers on it, and his horses nearly always turned out to be good workers. Mr. Birks always had the trough in the stable, and no harm had come to his horses. He had put brick floors in six stalls and they had answered admirably. He was satisfied that it would pay handsomely to bed the horses down and have the stalls cleaned out each morning. The manure would also be of more value if heaped up straight away. He would handle foals as soon as he could get hold of them. There was no set rule as to the method of breaking colts, as the temperaments of the animals differed so much. The Chairman would handle the animals well before making them haul a log. He would let them feel the chains on their legs, and if they wanted to kick he would let them do so. They would soon stop kicking when they found that they could not strike anything.

Whyte-Yarcowie, July 29.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. J. E. Hunt (chair), Ward, Lock, G. D. J. R., and W. Mudge, Faulkner, Robinson, F. Hunt, McLeod, McGregor, Travers, E. J. Pearce, and F. Pearce (Hon. Sec.).

SOME UNREALISED POSSIBILITIES OF PRODUCTION.—Mr. E. J. Pearce drew attention to the lesson such a season as the present should teach, viz., that of making provision in every possible way to increase the supply of fodder for stock. No proper attempt had been made in the North to grow those varieties of lucerne which were doubtless more drought-resisting than others. Strawstacks were valuable as a shelter, and also as a food in very cold weather. The food value of straw would be greatly increased if lucerne were sown with the wheat and cut with the straw. There was always the possibility of irrigation on a small scale on most of the farms. On some farms there were splendid catchments to provide large dams or small reservoirs; but, for want of these, millions of gallons of water ran to waste annually. He advised the excavation of deep dams in order to overcome, as far as possible, the loss by evaporation. They should be fenced, to keep away stock, and the water should be pumped or drawn out with a syphon. The Government could greatly assist producers by procuring up-to-date excavating machinery, and letting it out on hire, with an expert in charge. Underground supplies could, in some cases, be utilised in the same manner. In some of the northern townships small plots of about a square chain in area had produced feed for a cow and pony. This was done with the aid of a well and small windmill. He advised members to experiment with different varieties of seed, various systems of cultivation, and different times of sowing, in order to prove whether lucerne could not be made a profitable adjunct to wheat-growing. Members generally were of the opinion that no serious attempt had been made at lucerne-growing in this district. Mr. Ward said that some 20 years ago they had sown lucerne on their farm near Ulooloo, drilling it in with the aid of a bottle with a small hole in the cork. In one year they took five cuttings off the plot with the binder, and they sold £50 worth of lucerne. For two or three years the lucerne gave satisfactory results, and then died out, which he attributed to the rise of the spring water, which was close to the surface. He had found lucerne hay difficult to preserve owing to the fleshy nature of the plant, but he thought that if stacked with straw in alternate layers that could be overcome,

Yongala Vale, August 17.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. C. Fowler (chair), F. and H. Miller, T. Battersby, J. Lloyde, W. and G. Edson, E. Cooper, F. Laubsch, W. Keatley, B. Webb, G. H. Jansen (Hon. Sec.), and four visitors.

NATURE STUDY AS RELATED TO FARMING.—The Hon. Secretary read an interesting paper on this subject, in which he contended that although the study of nature, as dealt with in the schools, was necessarily of an elementary character, if followed up by the scholars it would be productive of practical benefit. A better understanding of the subject would enable the agriculturist to more easily cope with the fungoid, insect, and other pests which were the cause of so much trouble.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Balaklava, August 10.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. H. P. Burden (chair), P. Anderson, T. Lally, H. Roberts, J. Spillane, H. Twartz, P. H. Roediger, T. A. Thomas, W. J. Gleeson, H. M. Tuck, R. Goldney, L. P. J. Hoepner, B. R. Banyer (Hon. Sec.), and one visitor.

QUALITY AND WEIGHT OF SUPERPHOSPHATES.—Mr. W. J. Gleeson read a paper on this subject, in which he said he had recently had three samples of superphosphate analysed by the Government Analyst. One was under the standard, one was only standard, and the third was 5 per cent. over. They all recognised that their crops and soils require manures of the best standard to give good results, and they should not leave the very important matter of quality and weight entirely in the hands of the manufacturers. If they got samples of the season's fertilisers analysed and bags weighed it would cause vendors to use more care in getting it up. Next season he intended to see that all his fertilisers were analysed and the bags weighed. He had been told by some farmers that they had used low-grade superphosphate and the results obtained were equally as good as those obtained from the high-grade supers. If that were so they could save 7s. 6d. per ton by using the former. He had tried using varying quantities, from 60lbs. to 100lbs. to the acre, and he found that 70lbs. was about the best quantity for wheat, and would give good results on fallow well worked. Mr. Tuck believed it would be a good plan to have their manures analysed and the quantities weighed. He made a practice of sowing 10wt. of superphosphate, which enriched the ground, although perhaps 70lbs. would be sufficient for wheat, but the heavier dressing caused a heavier crop of grass. Mr. Thomas understood that the fertilisers were tested by the Government Analyst in accordance with law. It was a serious matter to lose 5 per cent. or 6 per cent. in the quality of their super. Mr. Goldney believed that on light land a hundredweight or more of superphosphate could be used without much danger of blighting, and the heavier quantity improved the growth of feed in the following year, although there may not be any increased wheat yield. On this class of land 10wt. would give better results than 70lbs. Mr. Lally had used practically all kinds of manures, and had found very little difference in the growing crops. He thought the old Lawes super. was the best, though it was a bit sticky. Mr. Hoepner thought 100lbs. better than 70lbs. of super., and though they might not get much better result in the wheat crop they would have it in feed. Mr. Twartz had weighed bags which were 10lbs. short, though perhaps the average shortage on the whole consignment was not more than 1½lbs. Dealers in chaff were compelled to put a certain weight in a bag, and manufacturers of manures should do the same, so that farmers would know what quantities they were using. There should be legislation providing for a certain number of bags to the ton. It was unsatisfactory to pay for

2,240lbs. and only get 2,000lbs. The quantity used per acre depended on the quality of the land. He could sow 100lbs. on his land, but did not think he would get any more feed. Mr. Anderson thought farmers had been fairly well protected by the Government in regard to the standard quality of superphosphate. They had no time to have samples analysed when they received the super. just at seeding time. On some land the quantity of super. used did not seem to make appreciable difference in the crop, whether half or one hundredweight was used, but experience at Roseworthy College had shown that poor land could be made to yield heavily with the use of superphosphate. Mr. Spillane thought the heavier dressing produced the most feed, but for wheat so much super. was not required. Mr. Roediger had used from 100lbs. to 120lbs. of super, on his land, and some land could be more heavily dressed. He had as good results from low grade as from high. He thought bonedust might be used with advantage. It seemed to help the wheat at the end of the season when it was ripening. [If the lower grade super. gives as good results as the higher, it will be cheaper to apply a less quantity of the high grade stuff than to put on the low grade. This will save freight. Careful tests with results weighed and valued are needed, however, before a man can be sure the lesser quantity of super. pays as well as the heavier dressing. The fact should be kept in mind that the heavier dressing tends to keep the land in good heart for future years.—Ed.]

Friedrichswalde, August 17.

PRESENT.—Messrs. P. Goodfellow (chair), J. and F. Heintze, E. Reichelt, F. W. Duldig, F. W. Schutz, J. B. Coombe (Hon. Sec.), and 13 visitors.

BUREAU LIBRARY.—It was decided that each member should contribute a small amount to provide a fund for the purchase of books on agricultural subjects to form a library for the Branch.

SMUT.—In reply to a question as to the cause of smut, the Hon. Secretary stated that the smut spores were usually present in the soil, and on the wheat itself, awaiting opportunity to germinate. For the disease to perform its function it was necessary that the spores should germinate at precisely the same time as the wheat grain. Bearing out this theory was the fact that wheat sown in dry soil was rarely attacked, as the smut spores germinated more quickly than the wheat, and consequently died for lack of a host upon which to feed. Wheat sown in wet soil, owing to quicker germination, was very often affected, even in spite of pickling.

Gawler River, August 23.

(Average annual rainfall, 18in.

PRESENT.—Messrs. W. J. Dawkins (chair), A. J. and F. Bray, H. Dawkins, J. Hillier G. Higgins, C. Leak, J. Hayman, F. W. Roediger, and B. F. Hillier (Hon. Sec.).

ESCUTCHEONS.—Mr. Geo. Higgins dealt with the escutcheon theory in a short paper, as follows :—"The escutcheon consists of the upward growing hair on the thighs and udder of a cow. It commences as low down as the hock on the leg, and from the front of the udder extends upwards to the vulva, stretching out on the thigh in the form of a shield. Three orders of escutcheons are—(1) The flandrinc, consisting of a broad band running up the back of the udder to the vulva ; (2) the left flandrinc, being a band half the width of the flandrinc and on the left-hand side ; and (3) the selvage, which has a narrower band at the top, but is broad where it commences and runs up to the vulva. As a general rule it may be taken that the higher on the thigh the shield markings extend the longer will the cow keep up her flow of milk, while the broader the markings on the thigh the larger will be the yield. The presence of two ovals of descending hair is a good sign. These are usually found on the udders of the best milkers. Cows with markings about half-way up the udder are usually very good until they are in calf, when the yield of milk at once falls off. This marking is very readily seen and is most reliable. Escutcheons are not confined to cows, but are to be seen on bulls. In purchasing a sire for dairy purposes make sure that he has the markings. The value of the theory is that it enables one to select good animals for the milking herd."

Mallala, August 12.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. G. Marshman (chair), J. J. McCabe, W. McCabe, A. Marshman, A. V. Nairn, Jas. Nairn, S. J. Temby, B. Temby, F. A. W. Kouzag, J. C. Curnow, T. H. Worden, and two visitors.

FRUIT-DRYING AT MILDURA.—Mr. E. Griffiths contributed the following paper:—“Formerly there were many more apricots grown in Mildura than is the case to-day. This fruit has gradually given place to the vine. However, apricot-drying is still a fairly large and, just now, a flourishing industry. This year we had nearly 4 tons of dried apricots. To make up that quantity it took approximately 45,000,000 apricots. To describe the process in a few words: The fruit must be taken from the trees just as it is fully ripe. If taken before it is perfectly matured it will only produce an inferior quality of fruit. On the other hand, if it is left until it has reached the squashy stage, it will be a poor grade, owing to its want of shape. From the trees it is taken in buckets to the pitting shed. Pitting is the process of halving and stoning the fruit and putting it out on the trays to dry. The pitting is done by girls who, by a deft use of the knife, cut the apricot clean round the rim of the stone and open the two halves, placing them face upwards upon a wooden tray. The trays are of various sizes, from 2ft. by 3ft. to 3ft. by 6ft., and the halved fruit, to economise space, must be packed as closely as possible upon them. As the trays are filled they are taken to the sulphuring room. Here they are piled on top of each other 20 or 30 high, and treated with sulphur fumes for about four hours. About ½ lb. to 1 lb. of sulphur will do about 40 or 50 trays. When removed from the sulphur house or box, the little cups left by the removal of the stones are full of juice, which quickly dries up when put out in the hot sun. The sulphuring greatly aids in the drying, which, in suitable weather, should take place in from three to five days. The trays are stacked for a day or two before the fruit is removed to sweat boxes, which hold from 10wt. to 1½ cwt. It is then ready for the factory, where it is graded and distributed to all parts of the world. There are four grades and one subgrade, termed 1, 2, 3, and 4 crown, the latter being the best quality. Peaches are treated in the same manner. The variety grown for drying purposes, though a good eating peach, is not as good as other varieties used more generally for that purpose. It is more fleshy, and is a better keeper. It also carries much better. Of course pitting peaches is easier than apricots, as they are much larger. Because of their greater size it takes two or three days longer to dry them. The quantity of peaches dried in Mildura is very small compared with the apricots. Figs are sulphured in the same manner as other fruits. Great care has to be taken in picking them from the trees to see that they are quite ripe. If pulled before the sugar is all in them they are useless for drying purposes; but it does not matter how ripe they are. In some countries they are left till they fall off the trees, and not treated till they have reached a semi-dry state. In picking care must be taken to break them off without removing the little bit of stem they have with them, otherwise they split and break in pieces before the packing is completed. When being submitted to the sulphuring they are packed closely together on the trays and stood on the flower end of the fruit. They take about one week to dry, after which they are sent to the packing company, where they are dipped in a solution of boiling brine, and in a softened condition, are worked out flat with the fingers and placed in the boxes ready for market. Currants are not treated in any particular manner, simply being gathered and dried. Like all dried fruits, they must be thoroughly ripe before being taken from the vines. The old way was to dry them on the trays, but many now are advocating the use of from three to six storey racks, made of wire netting drawn tightly between rows of posts. The currants are carried straight from the vines to the racks or trays, as the case might be. The trays are stacked 20 or 30 high upon each other and left for from nine days to three weeks. When the currants are nearly dry they are put out in the sun upon canvas. In a day or two they are ready to send to the factory. There they are stemmed and graded. The grade is decided by the body and color, also the gloss of the fruit. Some very heavy yields of currants were recorded in Mildura this year. In some instances as high as 3 tons of dried fruit per acre were gathered, valued at £40 per ton net. This would give a return of £120 per acre. Of course these were exceptional yields; but under good conditions currants are great bearers. Sultanais, or seedless raisins, are the most sought after of all the vine products, so far as Mildura is concerned. The vines are very extensively cultivated here, and they produce beautiful raisins. The fruit is taken direct from the vines to the dip. The dipping is done in perforated tins, holding about half an ordinary fruit case. Fruit and tin are dipped into a tank of boiling water containing a percentage of caustic soda. The dipping is for the purpose of cracking the skins of the fruit and hastening the drying. The immersion is only for a second or two, and after the liquid is drained out of the tin the fruit is put on the

trays or rack, as the case may be, to dry. The drying is complete in from three to six days, according to the weather. The color aimed at by all fruitgrowers is a clear amber or golden. Lexias, or pudding raisins, go through a similar process, but being a larger fruit, they take a longer time to dry. Cluster or table raisins are not dipped as Sultanias or Lexias are, but are put out on the trays from the picking tins. It takes from three to four weeks to dry them. Only the best fruit is reserved for that purpose. It must be a uniform size, with the berries large. In conclusion, I would say in reference to drying all fruit, that it is demanded, both in the growers' interest and to satisfy the packing companies, that it should reach the latter in a nice moist condition. It loses weight and deteriorates in value if over-dried."

Northfield, August 6.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Williams (chair), Rowe, Dall, Kimber, Roeger, Reynolds, E. W. Kelly, Thompson, and Mitchell (Hon. Sec.).

HANDLING AND EXPORTING WHEAT.—The following paper was read by Mr. W. Reynolds:—"As far back in our history as 1834 the editor of *The Times*, in a leading article dealing with the South Australian colonization scheme, said—'We take it for granted that the hope of mercantile profit by exporting wheat to England from such a distance would hardly ever enter into the motive of a sober-minded man.' This was the opinion of many leading business men of the day, but the past has proved their judgment to be at fault. The war with Russia in 1854, followed 10 years later by the Civil War in America, helped in no small way to establish, notwithstanding the high freights for oversea carriage, the Australian market for wheat in the Old World. In the period of our history just mentioned, the Argentine, as a wheat-growing country, was not thought of, and California, on the Pacific side of America, was the only serious rival Australia and New Zealand had to consider; but as all the wheat grown in that country reached the consumer *via* Cape Horn, this country could deal with this competitor on even terms, oversea freights being equal, i.e., from 25s. to 27s. per ton, whereas the charge per ton from Argentine is only 12s., or less than half the amount, giving the latter-named place a big advantage. When it is remembered that the cost of handling grain till it reaches the consumer must be borne by the grower, it at once becomes apparent that if the Australian wheatgrower is to continue to profitably compete with countries so much nearer the markets, his grain must be handled as cheaply as possible. The world's production is about 3,100 million bushels a year, and that of Australia 90 million bushels. These figures make it manifest that the quantity of wheat grown in Australia and available for export can in no way control the price of the commodity under consideration in the world's markets. There are upwards of 30 countries growing wheat for export, under almost as many different conditions. The chief of these are the United States, Canada, Argentine, Russia, and India. The United States and Canada handle all their wheat from the farm to the ship in bulk, at a very small cost when compared with the bag-handling system. Argentine transports from the farm to the seaboard in bags, and ships in bulk, the bags being returned to the grower; the same are refilled many times. California, Russia, excepting far northern Russia, and India, like ourselves, handle all their wheat from the farm to the home markets in bags. The Californian bag contains about 140lbs., the Indian 100lbs., and ours 200lbs. I take the following from a report by Mr. J. M. Sinclair to the Victorian Government, after he had visited the United States and Canada to inquire into the methods adopted by the wheatgrowers of those countries for handling wheat for export:—'Shippers in California stated that the cheapness of the small bag, and the quickness, facility, and economy with which it could be loaded, and the low rate of insurance for these cargoes had prevented them giving the attention to elevators which might otherwise have been given. At the time of my visit to Port Costa loading ships from the warehouse was being done. All the wheat was being weighed before being passed on board. Men provided with hand trucks with large wheels wheeled five bags at a time on a platform scale, behind which a man sat weighing. On arriving on the scale the man wheeling let go the handles of the truck, which tilted slightly forward on to a small block on the centre of the scale which supported the truck and bags in position. The weigher, in an instant, weighed the bags and truck. The man then, without delaying more than a few seconds, passed them off the scale to the man on the ship's side. Here the bags were passed quickly through three pairs of men on to a wooden shoot, down which, into the further end of the hold, flowed a continual stream of bags. The end of the wooden shoot terminated horizon-

tally about 5ft. from the underlying tiers of wheat already stowed. A number of men engaged in stowing seized the bags on the horizontal portion of the shoot, and with a jerk pulled them on their backs and carried and dropped them quickly in their places. The total number of men working in these gangs, including those wheeling, the weigher, those at the top end of the shoot and down in the hold, was 24. Their regular work in loading is from 1,000 to 1,400 bags per hour. The quickness in the men's movements at this work, and also at stacking grain in the warehouse, is most striking. In stacking or lifting, up to 10 bags in height is done by hand, pairs of men standing on ledges lifting at the end of the same bag. With our heavy bags it is impossible to handle grain so quickly and easily. It would have been a distinct gain for Australian farmers in the past had they abandoned their large sacks and gone in for the adoption of a smaller one.' Let the Australian farmer who has grown wheat for, say, five or 10 years, take a pencil and figure up what he has paid out during those periods for bags to send away his grain in, and also ascertain what he obtained for them weighed in with the grain when selling. He will find the total a very considerable sum, quite enough to build him a comfortable home, or pay a large machinery account. Mr. John Matheson, in a report to the Victorian Government, says :—' At country railway stations in the United States there are erected either elevated platforms or elevators for receiving grain in bulk from the farmers' wagons and loading it into trucks. Where platforms are placed they are constructed of strong planks, and are similar to those to be seen at Victorian country stations, but with the floors about 8ft. above rail level, and a railing on each side to prevent horses swerving off. A ramp is also provided at each end, so that the farm wagon can be driven up on to the platform. The wagons used by the farmers are flat-bottomed, without sides or stanchions. On these is placed a removable box about 4ft. deep by 3ft. 6in. wide and of the full length of the wagon, to the floor of which it is fastened by a few strong bolts. In some districts the farmers, instead of boxes, are now using opened topped tanks secured to the floor of the wagon. In these can be placed a hundred bushels of bulk grain. An opening covered by a slide is fitted in the side of the box or tank which, when the wagon is drawn up on the platform, is on an elevation of about 9ft. from the rails, thus giving sufficient fall for the grain, when the slide is drawn, to pass out quickly into a spout and thence into the trucks.' The rate charged by country elevators on the Canadian-Pacific Railway is three-fourths of a penny per bushel for receiving, cleaning, and loading into the cars. Storing in the elevator for 10 days costs $\frac{1}{4}$ d. per bushel. The cost of erecting large terminal elevators is from 9d. to 10d. a bushel on their capacity, and the cost of handling wheat by the large elevators is about one-seventh of a penny per bushel. Backham's pneumatic grain elevators load and discharge about 180 tons per hour. Large vessels are loaded in from one to two days.'

The unanimous opinion of members was that in South Australia the difficulties in the way of handling wheat in bulk were enormous, and the scheme was quite impracticable, except in perhaps two of the ports.

Riverton, August 8.

(Average annual rainfall, 20 $\frac{1}{2}$ in.)

PRESENT.—Messrs. J. P. Schultz (chair), W. Davis, F. Phillips, R. H. Cooper, Alf. Hannaford, J. W. Kelly, W. Stacey, E. A. Gray, A. F. Kemp, E. H. R. Scholz, W. H. Moss, and two visitors.

FALLOWING.—The following paper was read by Mr. W. B. Davis :—' The sooner after seeding fallowing is started the better. The ground should be ploughed well. 'Misses,' or 'pigs troughs' as they are commonly called, leave a hollow in the ground if they are not covered up with the cultivator. The implement should be in thorough order, each plough cutting and turning its full width properly. Sharp shares make the draught a good deal lighter for the horses. Every other year plough at different depths, from 2 $\frac{1}{2}$ in. to 4in. being the usual practice. If there are many such weeds as clover, dandelion, or stinkwort they should be well turned in, to act as manure for the coming crop. Summer fallowing carried out in the months of February and March is very suitable for the black and chocolate soils in this district. The fallow should be harrowed after a good rain. This will give the weeds a chance to grow, and the sheep can be run on it until after seeding, as it grows far more feed than the unploughed ground. Clayey soil should not be ploughed too deeply, as there is a danger of bringing too much clay to the top. Keep it from running together by cultivating during the spring. All fallowing should be finished in this district by about the end of August or the first week in September. It should be

harrowed when the ground is not too wet in the opposite direction to that in which it was ploughed, in order to break the sod. The rubbish will grow quicker, and it will leave a fine tilth for the next application of the cultivator, after which the cultivator harrows should be run over the land. The light harrows may be used throughout the year. Fallow should be harrowed as much as possible, especially after a good rain. Every harrowing means a bushel more to the acre. The finer the top soil is kept the better, as this conserves moisture. The light implements kill nearly all the weeds. Stinkwort is one of the greatest troubles in this district. If it can be killed when it is young there is less trouble in the seeding. A hundred and fifty acres of well-worked fallow are infinitely better than 200 acres badly managed."

Saddleworth, July 19.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. R. G. Townsend (chair), J. H. Frost, W. T. Frost, F. H. Kelly, P. Cornwell, J. Plueckham, W. Scales, P. Manning, F. Snell, R. Rex, J. H. Eckermann, and F. Coleman (Hon. Sec.).

CARE OF HARNESS.—The following paper was read by Mr. F. Coleman:—"Harness, as a rule, receives very little consideration on the farm, being mainly regarded as a provision for creating work for the farm hands on wet days. Little thought is required to convince that the working gear of the now expensive farm horse is an extremely important item; and since the harness in which he works has a great deal to do with his efficiency and value, a few remarks on the necessary care and attention which is required in order to get the longest service from the harness, with the greatest ease and comfort to the working horse, may be acceptable to the meeting. The collar is the most important part of the harness, as upon it the greatest pressure is brought to bear. Collars for heavy horses are either simply rounded at the lower part, or piped to allow of freer action of the windpipe. The piped collars are the most satisfactory, especially on horses with prominent windpipes. Scrupulous care should be exercised in the selection of the collar. Those who have suffered from wearing tight boots, or having chafed heels, can have some conception of the torment to the horse when he has to do heavy toil in badly-fitting harness. Two extremes must be avoided. The collar should not fit too tightly on the whole or any part of the shoulder, and it should not be too large. Chafing is caused by loose fits rubbing over a part, just as large boots chafe the feet. The collar should fit neatly and firmly over the whole of the shoulder. Whether it does this can easily be ascertained by buckling the collar tightly and gently moving it up and down and backwards and forwards until every part has been inspected. The chief seat of injury is the point of the shoulder. This is the most prominent part, and when the collar fits badly most of the pressure is taken by it instead of being distributed over the whole surface. Nothing is so liable to cause injury to the shoulders and prevent the horse exercising his full strength as a flat collar. A well-fitting collar, when new, is roundly stuffed, and fits closely over the shoulder. It possesses a springiness which makes it comfortable; but after a little use the stuffing is compressed, and the inner surface becomes flat. All collars, when in this condition, should therefore be re-stuffed. Collars are lined with serge or leather. The latter material is cool and easy to keep clean, but is liable to crack. This is a drawback for farm horses, therefore I recommend serge lining. Sweat and dirt accumulate on the surface, and should be regularly removed. If allowed to remain a hard condition is produced, which causes chafing. Young horses have tender shoulders, and are liable to chafe, especially in summer. Bathing the shoulders with salt and water hardens the skin and renders it less sensitive to injury. Where galls are already existent on the shoulder it is often a difficult matter to adjust the collar so that the horse can continue work. The best method is to make a depression in the lining, wide and deep enough to prevent the collar bearing on the sore part. Another plan is to fill stockings to form pads, which are stitched above and below the injured parts. In some cases where a horse's shoulders are so badly affected that no collar can be used, wearing a breastplate has been found effective. Fortunately these are extreme cases. Winkers are, I think, in most general use. Some favor the use of the open bridle. The arguments advanced against the use of winkers are that the eyes are enclosed, and become hot and irritated, and that the horse is more easily frightened by anything coming from behind. Horses, especially those used in crowded thoroughfares, are certainly less likely to bolt when worked in bridles. A full vision of everything before and behind is obtained, and the horse is not so easily frightened by anything rushing up suddenly. All drivers know

that a horse is less frightened by an object coming towards him than by one appearing unexpectedly. A further advantage is that if the headgear happens to be rubbed off, the horse using blinkers generally bolts, if possible, while the one wearing the bridle will remain undisturbed. Where teams are worked it is necessary to use blinkers to prevent the horses seeing behind. A lazy horse working with a bridle is constantly watching the driver, and immediately slackens off when the driver's attention is occupied by some other matter. The blinker would improve the value of horses for work under these conditions. Harness perishes very quickly if neglected, but if reasonable care is taken it will last for years. The leather should be kept soft and pliable by using some dressing such as neatsfoot oil. This should be attended to regularly."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Maitland, August 3.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. Smith (chair), Bawden, Heilemann, Hill, A. and E. G. Jarrett, A. Tossell, Wundersitz, and Pritchard (Hon. Sec).

THE BEST PLOUGHSHARE FOR FALLOWING.—In a short paper on this subject Mr. Bawden stated that the flat, broad share left a flat under surface, while the narrow share cut a furrow with the under part somewhat grooved. This was better for the retention of the moisture, and also encouraged the young wheat plants to strike down into the subsoil.

Minlaton, July 26.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. C. Parsons (chair), J. Martin, S. Vanstone, T. Gilos, E. Correll, H. H. Evans, R. H. McKenzie, J. McKenzie, and five visitors.

BINDERS.—Members agreed that the 7ft. binder was unsuitable as at present made. It should be manufactured stronger in proportion to the width, as in a heavy crop it could not deal with the full cut.

SEEDING AND HARVESTING.—The following paper was read by Mr. E. Correll:—"A successful farmer is often spoken of as having a lot of luck, and singularly this so-called luck seems to follow him in most of his operations. I maintain that there is no luck about it, but that a definite system, properly carried out, is the means of his success. The motto 'Anything worth doing is worth doing well,' if carried out, is bound to bring its own reward. As the soils and conditions in this country are so varied, it is necessary for each farmer to find out for himself by intelligent experiment, or by studying the methods of his successful neighbors, how to treat his particular class of country, and then follow up that treatment. The remarks in this paper will apply particularly to such lands as are similar to those of Yorke's Peninsula, having not more than 20in. of annual rainfall. Where the rainfall is over 20in. the methods may have to be varied to suit the different conditions. Any farmer can grow a good crop sometimes, but there must be some reason why a man can produce good crops year after year, with often great variations in the season and rainfall. To attain these results it is essential to start at the land intended to be treated as bare fallow, as it is through the medium of good fallow that good results may be looked for. Care should be taken not to plough under quantities of dry grass or straw, unless in wetter districts, where such will readily decay. The ploughing in of dry vegetable matter is one of the most fruitful causes of takeall, which fungus appears

to flourish where this is done. Dry matter will also prevent the soil from forming the good firm seed bed which cereals need. Most observant farmers have noticed that where the horses turn at headlands or corners, the crop is invariably the best in the field; then why not apply the principle to the whole field? A good burn will clear the way for fallowing, and the fallowing should be done at the earliest possible moment after the seeding is finished, ploughing as deeply as the class of country will allow, in deep soils to 6in. or 7in. if possible, and from 3in. to 4½in. in lighter soils where the subsoil is of a soft or rubbly nature. Take care to make straight work that will call for complimentary remarks from those who pass by, ploughing round and round the paddock, or piece, and alternately turning the furrow near the fences in and out, so as to always keep the land level. As soon as a piece of sufficient size has been ploughed, harrow down fine, preferably by crossing the plough work. This will remedy any unevenness left by the plough, which, unfortunately, is often worked so as to throw the furrows far from even. Keep all weeds in subjection as soon as they appear with the aid of the skim plough, or other light implement best suited to the requirements of the case. This can be supplemented by giving a few sheep a frequent run to get rid of any stray weeds. On no account allow any to seed, as a great factor towards success is to get rid of all weeds. Just before the summer sets in, or when the last cultivation takes place, allow the fallow to remain as rough as the implement will leave it. It will be found that an uneven surface will not absorb so much heat as a level surface; further, it will retard the pace at which drying winds will pass over it, will prevent drift in a great measure in loose lands, and if a summer rain occurs after harvest, it will break down much more readily if harrowed or cultivated across the previous work. It will be found that good early fallow so treated will have conserved inches of rainfall which will be drawn upon by the coming crop. Do not expect to find the moisture in the first few inches; this will not amount to much, but go down deeper, down even to 15ft. or 20ft., and this varies for each foot of depth from say ½ per cent. at the 15ft. or 20ft. mark, to 3 per cent. or 4 per cent. in the first 3ft. or 4ft., and the total will be such as to make one feel sure of a good return, given anything like a fair season. Do not rush in and sow all the crop if the season opens dry, but get everything ready, such as all stones or stumps picked, manure put through a sieve, and everything possible done, so that one may concentrate all one's effort in getting in the seed when the rain does come in the best possible time. If sown under dry conditions, the ground will not get into that desirable mechanical condition for the growth of a healthy plant; and also great numbers of weeds will come up which cannot afterwards be killed, and these use up the moisture secured at so much labor. Another point: I find it better to use a little more manure and seed, so as to force a quick growth and early maturity, than to sow too early, which often leads to a heavy crop of straw. This having consumed all the moisture, the grain ripens off too quickly, and the crop does not yield in comparison with the wealth of straw. In drilling I prefer going round the piece instead of backward and forward. By so doing the short turning is avoided, more can be got over in a day, the drill can work right up to the cultivator (which should go ahead of the drill), and the crop will ripen all round at the same time, provided the soil is even. This will enable the harvester to get to work a day or two earlier than if one side of a piece is sown a week or more later than the other. The foregoing will apply equally to wheat, oats, or barley on fallow land. For a second crop I find oats or barley the most profitable, both as to grain production and subsequent feed when left out of crop. In the case of oats for hay, the second crop may be sown as early as one cares, but for grain production I think it best to take advantage of any rain that may occur before seed time, and break up the ground intended to be cropped. Harrow or roll down finely, and cultivate with a good implement after weeds have germinated, and drill in at once, the object being to conserve moisture for the use of the planted crop only. I think it desirable to plant fairly deep, with the object of getting the manure well down in the soil, where there will be a better chance of the plant getting it, as it will thus be in moist earth, and more of it will become soluble. If on or near the surface, it only becomes soluble as rains wash it down. The plant will take care of itself, and may be put down 2½in. or 3in. with safety. One may lose a few plants if they are put in deep, but I am of the opinion that the plants that do come through more than compensate for the loss. If one examines a young plant of wheat, oats, or barley three or four days after it has come up, or at a later stage in its development, it will be noticed that a little nodule appears on the plant at that point in the soil where nature has decreed is the proper depth for the permanent roots. The distance between the grain and these permanent roots varies according to the depth of planting. As soon as the upper, or permanent roots are established, the first roots, being at too great a depth, and not being any longer required, die. It is here again that the benefit of placing the manure deep occurs. A dense mass of very fine rootlets which form round the plant are led downwards towards the manure, and thus are less

liable to be affected by the scorching influence of the summer. This point can be exemplified by putting a dressing of stable manure, for instance, around a fruit tree, when it will be found that a mass of roots form immediately under the surface, which get scorched in the summer, injuring the tree. It must not be forgotten that the roots of cereals readily penetrate to a depth of from 4ft. to 5ft., and sometimes more, and draw on accumulated moisture by capillary attraction to 15ft. or more, so that it is important to get the roots to work as deeply as nature will allow. Having prepared the ground, the next important question is the seed and its preparation. The greatest care should be taken to either grow, or procure from some reliable grower, pure seed. This should in all cases be graded with the greatest care, so that only the very best is retained. The cracked or small grains will be far less wasted if fed to pigs or poultry than distributed to rot, or produce weakly plants in the field. In the case of wheat, I am firmly convinced that if the seed is taken from a crop that has been well pickled with sulphate of copper (bluestone), and the succeeding crop sown with dry seed, the results will be more than satisfactory; only that which is required for the next season's seed being pickled. This is a practice I have followed up for eight or nine years, and I have been able to produce a sample clean and free from smut. The last time I pickled the bulk of the crop I lost 8bush. per acre thereby. Dry sowing in this district is now becoming fairly general, and I feel sure that if this practice were carried out throughout the State the total yield would average bushels per acre more than at present. However, if dirty seed is sown, there is no hope of reaping a clean crop. It is well known that pickling kills a large percentage of grain, and retards the germination and growth of the whole, often causing it to lose quite a fortnight as compared with the dry-sown plant. It is equally important to grade barley, and oats may be treated similarly if intended for grain. Barley may be pickled every time, as the injury to the plant is not nearly so marked as is the case with wheat, owing to the outer husk or shell protecting the grain. Pickle oats if the variety is liable to take smut. Do not starve the crop for the sake of saving a ton or two of manure. Put on more than a crop will use. It will be fully utilised during the following years. Part of it will be carried feet into the subsoil, and the deeper roots will surely find it. Part of it will be found on your sheep's back, and another part in the carcass. To leave a nice even job I prefer using the harrows after the drill. This implement will shake the earth from the roots of weeds, cover any seed not covered by the drill, and solidify the land, and will finally make the harvesting machines easier to draw, with less bumping. A word with regard to lucerne. I would strongly advocate every farmer to adopt the practice of sowing from 2lbs. to 4lbs. of seed when sowing the last crop before leaving a field out for grazing, mixing the lucerne seed with the wheat, oats, or barley. This will be very little trouble, a trifle of expense per acre, and of immense benefit to the stock-carrying capacity. It will enrich the soil in nitrogen, its deep roots will open up the subsoil, and the succeeding crops will be much benefited. I may remark that I have found lucerne roots 14ft. down from plants only two years old. By following up this practice one can generally cover 50 or 100 or more acres with lucerne seed each year. This will save the haystack and improve the health of stock. While the crops are growing, see that all fences are put in good repair, attend to any improvements needed, and generally put everything in as good order as circumstances will allow. Get all harvesting machinery put in thorough order some weeks before it is actually required. Do not leave it to the last day or two and then complain if your blacksmith is too busy and cannot do the repairs at a moment's notice. Adjust the harvester or winnower so that it will make a good clean sample, such as one would feel proud to show to one's neighbor or merchant. Let everyone do the same—it may mean raising the standard $\frac{1}{2}$ lb. or 1lb. per bushel. With respect to the water supply, it will amply repay to lay piping and convey the water to every field. If this is done stock can be placed in the field desired, and, having both food and water, will undoubtedly thrive much better than if obliged to travel some distance and perhaps struggle with others to get a drink at the source of supply. Any young stock can be kept out of the way of the workers if shut up in a watered paddock, and thus assist their owner as well as benefit themselves. Experience has taught me that it is more profitable to grow hay on fallow than as a second crop on wheat land. If sown on fallow a supply of good clean sweet hay can be secured from one-third of the area required to produce a similar quantity of poorer quality owing to the prevalence of poppy, charlock, and other weeds on stubble lands. My practice is to mix bushel for bushel of a good hay wheat (I use 'Corroll No. 7') with Calcutta oats. I set the drills to sow from 35lbs. to 40lbs. of the mixture, and drill twice, going round the piece either with two drills of different width, or working the second time with the centre of the drill over the previous wheel mark. The manure can very well be set at lowt. each time, making a dressing of 2cwt. By this method I have secured crops of from 4 tons to 5 tons per acre during the past three seasons, but only using 1 $\frac{1}{2}$ cwt. of manure. Thick

sowing will give a finer straw and proportionately more grain than thin sowing. As the surveyors on most drills are not reliable, I would strongly advise every drillowner to write on his drill the correct distance such drill will travel to sow an acre. Travel over this distance in the field once and mark the result on the surveyor, and also on the drill lid. It will show what one is doing at any time, and come handy for reference to any new hand taking the drill. The 11-hoe drill will travel $113\frac{1}{2}$ chains for an acre; the 13-hoe drill will travel $94\frac{3}{4}$ chains for an acre; the 15-hoe drill will travel $80\frac{1}{2}$ chains for an acre; the 17-hoe drill will travel $70\frac{1}{2}$ chains for an acre; the 19-hoe drill will travel $62\frac{3}{4}$ chains for an acre. In cutting, take the binder round the piece, and so follow the drills. It will be found that cutting across drills will give a succession of shocks to the binder, due to the knife engaging its full length when over the drill mark and then running empty for 2in. or 3in. before engaging the straw in the next drill. Follow as close as possible after the binder, and stook at once. By so doing the stooks will all dry together, and will stand high winds much better than if allowed to wilt before being handled. If it is desired to stack at the earliest possible moment, put it up in long stooks (four in a set) with an air channel through the centre. If drying winds prevail it may be ready to cart in a week or 10 days. If it cannot be carted for some time, or has to be left till after harvest, put it up in round stooks, not too big, but standing as upright as possible. This will enable it to stand with little injury from sun or rain. When it is very hot, leave the hay alone. If put into the stack dry and brittle, it will come out in the same condition, even in the middle of the following winter. It will be bad to handle, and will break up badly when chaffing. When stacking, place every sheaf with its butt outward, never placing a sheaf lengthwise of the stack, as such sheaves will not pull out when the stack is being taken down. Keep the centre of the stack from 2ft. to 3ft. above the sides from start to finish. Finish with not too steep a roof, and thatch well with straw cut with a binder, securing the same with binder twine from sheaves and Launceston palings split to make suitable pegs." In discussing the subject members did not approve of deep drilling. They were of opinion that all that was necessary was to cover the seed properly.

Pine Forest, July 30.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. D. Carmen (chair), G. Inkster, A. Hewett, A. Nelson, W. Attenborough, S. Barr, C. Schultz, W. Smelt, R. D. Goodridge (Hon. Sec.), and a large number of visitors.

EXPERIMENTAL PLOTS.—The experimental plots being conducted by Mr. Barr were inspected, and it was found that they were doing very well.

ANNUAL MEETING.—On account of this being the annual meeting of the Branch, a social gathering was held in the evening, at which there was an attendance of about 100. The report of the Hon. Secretary was read, and the Secretary to the Advisory Board delivered a lengthy address on the Agricultural Bureau and various other matters of interest to agriculturists.

WESTERN DISTRICT.

Coorabie, August 3.

PRESENT.—Messrs. C. T. Giles (chair), W. H. Wheadon, C. Wheadon, Riddle, Atkins, Murray, Gregory, Kinsley, C. Hobbs, Attick, Woodforde, Cousins, Coppins, Roberts, Underwood, H. V. Hobbs (Hon. Sec.), and one visitor.

FOLLOWING.—Mr. C. T. Giles read the following paper on this subject:—"I strongly recommend following in this district, for several reasons. In the first place there is no

doubt that the yield is greatly increased ; secondly, fallowing is a great help to the farmer in his battle against troublesome weeds and rubbish ; and thirdly, a very important point, it puts forward seeding operations for the succeeding year. The three years' course of feed, fallow, and crop is not practised to any extent in this district, on account of the farmers not having sufficient land cleared ; but if there is sufficient cleared land I would recommend that system. The year that the land is under grass would do much to firm the soil, and thus reduce the liability to drift. When bare fallowing, I would recommend burning the stubble. The plough would destroy the grass much better if the stubble had been already burned. The fire also destroys many weeds. The farmer should regulate the time of fallowing in order to finish before the grass goes to seed. Fallowing should not be commenced too early, as ample time should be given for all weeds and other rubbish to germinate. A saving in the subsequent working is thereby effected. About the end of July or beginning of August is a good time to commence, but the time must be governed by the amount to be done. A plough that cuts all its ground and turns the soil well over should be used. It is a mistake in this district to plough deeply, as the subsoil is so near the surface. Three or four inches is quite enough. Ploughing in showery weather is a waste of time, as it transplants the rubbish you wish to kill. Ample strength for the ploughing should be obtained. It is better to have too much strength than too little. I would work leaders if using more than six horses, as otherwise they are liable to trample on one another's heels when turning the corners. The after working of the fallow can be easily overdone in this district on account of the liability of the land to drift. If the land is kept clean the less working that is done the better. It would pay every farmer to keep sheep, if only for the benefit to the fallow. I would not sow wheat on fallow land before the first seeding rains, unless the season opened unusually late. The moisture which is always to be found in fallow will, in places, be sufficient to cause germination, but in other places it will cause malting." Mr. Kinsley favored ploughing in the stubble in preference to burning it off. The former returned the organic matter to the soil. Mr. Atkins favored fallowing early in order to conserve moisture. Mr. Riddle considered it advisable to commence fallowing directly after seeding, provided the grass had got a good start. The horses were in better working condition at that time than if allowed to run for a month or two on green feed. The months generally favored by members for fallowing in this district were July, August, and September, but not later than September. Mr. Attick preferred the disc plough, as did Mr. Kinsley, in stubble and clear ground, but not in stiff grassy land. Mr. Riddle expressed the opinion that it was worth while cultivating stubble directly after seeding in order to encourage the mustard seed to germinate, so that it could be fallowed in. Members differed in opinion as to the best implement to use for the after workings. Some recommended the skim plough, while other preferred harrows. Members generally agreed that fallow land should be thoroughly worked, whether woody or not, for the benefit of the soil. All members agreed that it paid to keep sheep, and to run them on the fallow occasionally. Mr. Atkins thought that a team of eight horses should be worked in fours. Mr. Riddle preferred working them abreast. Mr. Underwood thought that by working in fours the necks of the back horses would suffer through the draught of the leaders.

HORSES ON THE FARM.—Mr. C. B. Atkins read the following paper on this subject :—
 "I prefer the medium draught horse for general farm work in this district, as it is more active and stands the travelling better than the light or very heavy draught. I have both light and medium horses on my farm, and I find it takes no more to feed the larger horse than it does to feed the light, and fewer horses are needed to do the work. I would advise any man beginning farming on a new farm to buy two or three good medium upstanding mares of the Clydesdale class if possible. He will then have a good mare to begin with. Weighty horses are the best in these districts, because good strong horses are necessary for the farmer to get his produce to market over the bad roads. Every farmer should obtain two or three foals every year if possible. He will then be able to replace the aged with the new stock. The Clydesdale is the best sire for this district, as the mares are on the small side. By adopting this course the farmer will be able to breed a larger and better stamp of horse." In the discussion that followed Mr. Kinsley stated that the pure Suffolk Punch was, in his opinion, the ideal farm horse. Mr. Riddle expressed the opinion that if using a Suffolk Punch sire he would only mate him with big heavy mares, and so get a serviceable draught horse. The Hon. Secretary stated that the Suffolk Punch did not cross well with the other breeds of draught horses. Considerable difference of opinion existed as to whether the light or medium draught horses required the more feed when working side by side, but the majority thought that the light horse was the easier to keep in condition,

Elbow Hill, July 27.

PRESENT.—Messrs. Cooper (chair), G. Dunn, J. Rehn, E. Wake, H. Wheeler, S. Wake L. Wheeler, E. Story, A. Wake, A. Chilman, P. Wake, C. Jacobs, G. F. Wake (Hon. Sec.)' and two visitors.

CARE OF FARM HARNESS.—Mr. H. Wheeler read the following paper on this subject :—"Farmers are apt to pay too little attention to their harness, which should be thoroughly overhauled and oiled twice a year. Neatsfoot oil is most suitable for heavy harness, and for light harness Lewis & Whitty's fatblack and polish should be used, as dust does not collect on it as it does on oil. Every horse should have separate collar, hames, and winkers, and should not be worked in any others. The collar should fit the horse, because if too big it is liable to work round on the shoulder and so chafe. If the collar is too small there is always a danger of the horse choking down. Farmers, when buying horses at sales, nearly always buy the harness with them. This is a mistake, as very often it is a misfit. It would pay far better to take the animal to a saddler and try on the collar before buying it. Always hang the collars on a rail when not in use. Frequently they are thrown down in a heap, and so the padding is pressed out of shape. They should not be hung up in the stable beside the horses, as they are likely to be knocked down and trodden on. It pays better to keep all the harness in a separate shed near the stable. In cases of sore shoulders the hames are very often as much at fault as the collar, because if the draught is not in the right place the collar will not set in its proper position. This must be determined by the shape of the shoulder. The hames should fit tightly on the collar. Wagon saddles should always be kept well oiled. When buying a wagon or dray saddle it is advisable to get the largest size, as a small saddle is bad on a horse's back. When working a team carry a few rivets. If a strap breaks it can then be mended immediately without much trouble, and this will very often save much inconvenience." In the discussion that followed Mr. Chilman agreed that it was advisable to have a separate shed for the harness. Mr. E. Wake thought harness should be oiled twice a year. Mr. Rehn said it was a good plan to have a strip of leather on the farm in order to effect repairs. When cutting the leather it was best to cut the whole length, so that a straight side could be had when wanted. Mr. A. Wake contended that each horse's hames should be hung in its stall, so that there would be no mistaking them.

CO-OPERATION AMONGST FARMERS.—The following paper was read by Mr. S. V. Wake :—"In a district such as this, where one farm joins on to a neighboring one, and good roads connect, I maintain that by the co-operation of a limited number of the men on the land they could minimise their expenses in the machinery line and in various other ways. Let us consider the advantages to be derived by the united purchasing of a few lines of machinery. Now the average farmer does not grow sufficient wheat to warrant him buying a motor winnower. If three or four were to club together in the purchase of same, each reaping a portion of his crop with the stripper, and all assisting in manning the machine, they could very soon clean their heaps more thoroughly, saving time, money, and chaff. The latter in many parts of Australia would have been very acceptable during the autumn of this year. I have had enough experience with the hand and horse-power winnowers to judge which is the easier and cheaper way of cleaning wheat, and the motor is far in advance of either. Where we cut hay only for our own use, if properly worked a binder could tie in from eight to 10 days all the hay one would require for the year. This machine is practically idle all the rest of the year, and two farmers could very well manage with one between them. I see from the *Journal* that the members of a certain Branch have procured a seed grader. If others followed the example it would be to their advantage, as well-cleaned seed is necessary to ensure even distribution and proper germination. There are many other cases in which the same system could be adopted. I also wish to draw attention to the breeding of horses. I am in favor of, say, four or five farmers owning between them a good Clydesdale stallion, and keeping him for their use only. The horse could be kept and worked by one. This should ensure a better percentage of foals. Co-operation in rabbit destruction would greatly assist in keeping the pest in check. Branches of our Bureau should work with more enthusiasm and energy than they do now. Several matters of importance referred to our Branches by the Advisory Board for consideration have been neglected. Take the weighing of wheat in bulk, and blocks for farm laborers. Only 45 responded in the case of the former and 34 in the latter, out of 130 Branches. If reforms are to be brought about in matters which concern the producers, we should be alive to our interests, and the Bureau should be the intermediary between the producers and those in authority." In the discussion which followed Mr. Dunn thought co-operation was all right for farmers who were just starting, but when one could afford to buy the machinery he required, it was better for him to do so. He favored the co-operative ownership of a good draught stallion and also

a seed grader. Mr. Chilman said a motor winnower would do for three or four farmers, but Mr. J. Rehn thought it best for every farmer to buy his own machinery, as it was always to hand when wanted, and there would be no disputes with regard to paying for breakages. Mr. E. Wake favored co-operation for the purchase of a seed grader and a draught stallion.

Green Patch, July 29.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. F. Gore (chair), J. Sinclair, sen., J. Sinclair, jun., G. Sinclair, R. Sinclair, E. Chapman, G. Merchant, C. Parker, C. J. Whillas (Hon. Sec.).

SPRAYING FRUIT TREES.—Mr. G. Merchant read the following paper on this subject:—
 “We are free of many of the insect and fungus diseases that are prevalent on the Adelaide side of the Gulf; and here I would sound a note of warning to those who contemplate growing fruit and vegetables. If great care is not exercised we will not be long free from them. I have consistently advocated planting fruit trees, as we have soil and climate to produce fruit for commercial purposes; but care will have to be shown in the management after planting, and watchfulness shown in regard to diseases, either insect or fungoid. It would be a good plan if the Government were to appoint a competent person as a travelling instructor, to show growers how to prepare land, how to plant, to treat and to prune fruit trees, and to detect any disease that might at times gain a footing here. I know the need of such, by the numbers of letters and inquiries that I have had this winter from persons that are about to embark in this enterprise. Curl leaf is a fungus that is only active during the spring months. The spores or seeds remain dormant on the host plant through the other part of the year. This is well known to all growers of the peach on the Adelaide Plains, but not so well known here, as it is only just making its appearance. If we combat it from the first, it will not entail much labor or cost, and will not do much damage. Now the first essential in dealing with disease on tree or plant is the spray pump, and I would advise two or three growers that are near each other to purchase a small plant. It will not cost more than £3, and will last for years if taken care of. The best preventive we have is the Bordeaux mixture, which is composed of lime and bluestone (sulphate of copper), with water. In the case of curl leaf, it is necessary to do the spraying before the disease makes its appearance, as when it appears, all the spraying will be of little avail. When mixing take 4lbs. of copper sulphate and dissolve it in 3galls. or 4galls. of water. This must be done in a wooden or earthenware jar, as it will eat through tin in a very short time. Six pounds of good new lime should be slaked in a kerosine tin with about 2galls. of water. This will make 40galls. of mixture. Half a pound of bluestone will make 5galls. The mixture should be made just before it is intended to apply it. The time to apply is the most important factor. Keep an eye on the peach trees and, just as the buds begin to burst, or just as the pink of the first blossoms appear, apply the mixture. Damp all parts of the tree. Do not put on too much, as being heavy, it will run to the ground. Keep the mixture well stirred to prevent settling. When mixing the limewater with the copper, strain well, and strain again through bagging into the spray pump. There is another disease that has made its appearance in the district, that is black scale. I have seen it in several places on apricot and quince trees. This disease is easy to detect. If any of the trees have a sooty look, examine them well, and brownish and nearly black scales will be found. These scales cover a large number of eggs, which hatch out in the early spring. They are so small that they do not attract any notice, being like small specks of white ashes. If I am not greatly mistaken, we shall suffer for the apathy we are showing at the present time in regard to codlin moth. It is in the district, and, unless we take the matter in hand and deal with it in a drastic manner, we shall suffer in the near future. We should to-day discuss what steps should be taken to eradicate it from the district. What endless labor and expense would have been saved growers on the other side, if the governing bodies had grappled with this disease when it was first found in a few old apple and pear trees in Hackney near a jam factory. A few pounds spent in rooting them out and burning, would have saved thousands to the growers. Other diseases can be treated with the following remedies:—Red spider, sulphur and lime; thrip, tobacco water; scale, kerosine emulsion or red oil.” After the paper was read Mr. Merchant explained the difference between the potato moth and the codlin moth with the aid of colored plates. He emphasized the importance of immediate action to stamp out codlin moth in two old gardens existing in this district.

Miltalie, July 27.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. A. R. S. Ramsey (chair), W. G. Smith, H. R. Jacobs, C. E. and S. R. Searle, T. A., A. M., M. H., and P. G. Wilson, J. P., J. W., and E. Story, W. E. Hier, (Hon. Sec.), and three visitors.

SHEEP ON THE FARM.—Mr. H. R. Jacobs read a paper, in which he stated that when the land in this district was subdivided a good income should be derived from sheep. They were unable to take advantage of the export lamb trade owing to the high freight charges. Several farmers essayed a shipment of lambs some time ago, but it did not prove successful. Apart, however, from the fat lamb industry it would pay well to keep sheep. They were of great value in destroying weeds after summer rains when the farmers were busy with harvest operations. It was advisable to keep wool-carrying breeds. The Merino was the best, as the wool returned the highest prices and the sheep themselves could live under more adverse circumstances than was the case with other breeds. For home purposes he preferred a cross with the Shropshire, as these grew more quickly and were a heavier type of sheep. Closely wired fences were necessary for these animals. Sheepskins should be hung lengthwise over a rail in the shade and brushed with weevil wash if kept for any length of time. In the discussion which followed the Hon. Secretary favored the Merino, as it was easy to keep within the fences, grew better wool, and provided good mutton. Mr. J. P. Story said sheep were very useful for cleaning fallow. The Merino was a good breed to begin with. Mr. W. G. Smith did not favor cross-breeds for this district. Skins should be fastened to a frame and properly stretched out. Weevil wash kept dogs and cats from tearing the skins, besides destroying weevils. Mr. R. Smith (a visitor) considered that mixed farming would become a feature in this district. He favored the Merino, because of the market price for fat lambs. Mr. Jacobs, in reply, said his experience had been that wool had brought a better price when the Merino ewes had been crossed with Shropshire rams.

Miltalie, August 24.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. A. R. S. Ramsey (chair), J. P., J. W., and E. Story, F., J. S., and H. R. Jacobs, F. F. Alm, W. G. Smith, P. G. and A. M. Wilson, C. E. Searle, W. E. Hier (Hon. Sec.), and two visitors.

FARM LABORERS.—Mr. A. M. Wilson read the following paper on this subject:—"To the farmer without a family the question of labor is an important one. To work his farm properly and profitably he must hire assistance. If the employer were to show more consideration, however, he would experience less difficulty in obtaining this. Hands should be paid the ruling rate of wages. The quarters should be roomy and weather-proof. If the man is hired permanently he should be allowed a fortnight's holiday every year on full pay, and also an occasional half-day. If the laborer is married, it will pay the farmer to build a four-roomed house, and allow his man to keep a cow and poultry. It might be advisable to give the laborer a share in the crop, as the responsibility and interest created would cause him to work in a more thorough and painstaking manner." In the discussion which followed, Mr. J. P. Story and Mr. F. Jacobs both agreed that if farmers considered the comfort of their laborers more there would be less difficulty in obtaining men for farm work. Mr. W. G. Smith thought that it depended on the farmers' means as to the size of the house for married laborers. Mr. J. S. Jacobs favored the share system, and agreed that laborers should be allowed a day off occasionally. Mr. E. Story did not agree to allowing laborers two weeks a year on full pay.

Petina, August 17.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. W. Penna (chair), D. T. Kenny, I. Kenny, J. Bascombe, E. Keeley, D. J. Howard, H. Doley, G. Newbon, G. H. Newbon, J. H. Wharf, J. M. Souter (Hon. Sec.), and four visitors.

IMPROVING THE FARM.—Mr. J. H. Wharf contributed the following paper:—"It is quite impossible to lay down any rules or lines of guidance for the man taking up land,

as everything depends on the circumstances of the settler and position of the holding as regards water, roads, &c. Probably all have made mistakes in starting in some way or other. There is, however, one point that most will agree on, and that is economy is absolutely necessary in starting a new place. A new settler is, in my opinion, quite justified in putting improvements that will meet requirements for the time being, even if they are not so stable and substantial as one would expect to find on older settled farms. This applies to fencing, tanks, dwellings, stables, and sheds. The actual farming should, however, be conducted on the best known lines to give the best possible results. As time goes on and the farm is prosperous, the farmer should provide a comfortable dwelling-house with large and lofty rooms, good ventilation, with a fireplace in each room. A capacious tank (with a good iron roof) for domestic purposes is necessary. A comfortable men's room, sheds, barns, and stables should be made with high gable iron roof, with tanks provided for holding the water caught thereby. The farmer who has to depend solely on tanks, seeing that shallow tanks lose so much by evaporation, should provide one or two, say, 10ft. or 12ft., for a stand-by in case of drought. On account of rabbits it is necessary to use a good deal of wire netting. The life of netting in scrub land is about 10 years, and rather more on plain land. The failure of netting to withstand rust is due in a great measure to the fact that it has not been properly tinned when manufactured; probably a bath of gas tar would prevent rusting so quickly. When the netting is too bad to keep rabbits out, and where stones can be had close by, the trench should be opened out and filled up with stones and finished off with a row on each side. This plan is very effective, but takes a lot of time. Iron posts should be used where the rock is close to the surface. Rough and high stumps are a source of worry, being the principal cause of breakages in farm implements. They can be easily dealt with in the dry summer by burning. I have an old sheep trough 8ft. long, mounted on wheels, and drawn by a horse. A fire is made and wood is put in the trough, and coals are placed on the biggest of the stumps." In discussing the subject, Mr. Howard said shallow tanks were less liable to leak than the deeper ones, on account of the less weight of water. Mr. Lewis preferred good sharp sand for cementing, and for the bottom of a tank he would use broken metal. The difficulty in getting tanks to hold in this district was due to the sand not mixing well with the cement.

Utera Plains, July 27.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. P. Sinclair (chair), A. Ramsey, A. Venning, W. Gale, W. Stephens, J. and M. Abrook, H. T. Hornhardt, F. Braunack, G. C. Bilney, M. Hunt, H. Rule, F. H. Haywood, W. Lee, R. Hill (Hon. Sec.), and five visitors.

SOILS.—The following paper was read by Mr. A. Ramsey:—"The soil is a most charming chemical laboratory, where numerous complex chemical changes are constantly taking place. We can scarcely imagine it as teeming with life, microscopic though it be; in fact, more thickly populated than the surface of the earth. For generations and generations the soil and everything connected with it has been shunned. Only during recent years have farming and gardening been considered desirable callings to pursue. The immense strides which have been made in agricultural science have done a great deal to raise the rural industries to a high level. The spirit of investigation has been aroused, and every intelligent farmer is studying his soils and crops, and endeavoring to understand more and more about the farm which he owns. Nothing seems simpler than to make a chemical analysis of a soil and find out what is missing in it that makes it inferior to a soil in another part of the State; but it is not such a simple matter as it looks. The soil is not only a vast reservoir of plant food which can be drawn upon by the roots of plants just as needed, but it is also a great factory where raw material in the shape of manure is formed into the finished article—the crop. A complete knowledge of the soil and the part it plays in the feeding of the plants is only obtained by an investigation into the chemical, physical, and biological aspects of the question. We must not regard the soil as a mere storehouse of plant food. Water is indispensable to all plants. It is, therefore, of paramount importance to study the movement of water through the soil. The texture of the soil and the proportions of water and air which it retains, affects its temperature. Some soils are much warmer than others under the same conditions, hence some soils are early and others late. The soil is not a dead, inert mass. It is a scene of the greatest activity, both chemically and biologically. Were we able to watch the countless operations going on in the first foot of soil we would be filled with wonder and amazement.

Probably, with all our great inventors working on these subjects, we shall some day have presented to us in cinematograph style a busy scene as enacted in our surface soil. Some of the organisms in the soil work upon the dead vegetable matter and completely transform it into valuable plant food. Other organisms work in an opposite direction and destroy the plant foods. Certain other organisms live upon the roots of plants, to the mutual benefit of both. One cannot help noticing that certain plants do better in some regions than others. Some plants grow well near the seashores, whilst others grow to perfection in our very sandy soils. Certain weeds grow well in clay lands, others again tolerate the sandy stretches of country. Plants are much influenced by environment, and at times are slow to adapt themselves to new conditions. This is noticeable with introduced plants. A wheat that does well in Russia or Manitoba may, during its first season, be almost a failure in our State. It may take several years before the new plant accommodates itself to new conditions of life. From what has been stated it must be felt that a thorough knowledge of the soil and its origin is of great importance to the farmer. If we take samples of soils from various sources we notice that they are composed of mingled fragments of different material, chiefly small particles of rock of varying sizes, from small pebbles to grains only discernible by the magnifying glass. From such examination we are led to believe that all soils have been formed from rocks. All soils are derived from the original or igneous rocks of the earth. Granites, diorites, and gabbros are good examples of the primary rocks of our globe. Geology teaches us that our globe was once a molten mass, which, upon cooling, solidified into rocks. These rocks must have contained all the mineral matter of plant food. We can study these changes best by reference to the lava beds of recent origin. In an incredibly short time this molten material solidifies, and the resulting rock is soon transformed into more or less fertile soil. The first step in the formation of soil from rock must be the breaking up of the rock into smaller particles. Quite a number of natural agencies take part in this process. Heat and cold, the action of air, water, ice, and wind, all have their work to perform in this respect. Consider a granite rock. We are all familiar with the granites at various parts of South Australia. Those who have visited Port Lincoln must have been struck with the great development of granite rocks in that district. It is an easy matter to distinguish with the naked eye three distinct minerals which comprise these granite rocks. The black-looking, shining material which peels off in small flakes is mica; the pink mineral is felspar; and the somewhat bluish mineral is quartz. A typical granite contains mica, felspar, and quartz. These three minerals are differently affected by changes of temperature. When heated they expand at different rates, and when cooling their rates of contraction are different. When such rocks are subjected to extremes of temperature the result must be that they are shattered; not, of course, in a single night. The natural forces are continually operating. In our northern districts, and particularly in Central Australia, the difference in temperature between day and night is very marked indeed. At the hottest part of the day a temperature of about 160° is experienced, which gradually sinks to zero at night. The water will almost boil in the day, and at night become frozen. Rocks in these regions are constantly being strained by the unequal expansion and contraction of the component minerals. Even if the rock is composed of only one mineral, these changes of temperature gradually tend to disintegrate it. It can easily be imagined how soon granite rocks begin to crumble away in the dry regions. They are eventually reduced to dust. Then the wind does its part in conveying this dust to other places, piling the material up into vast sandhills or dunes. The great sandy ridges of Central Australia, the dunes of Sahara and Central Asia are formed in this way. There are immense deposits of loess in China. This vast accumulation is supposed by geologists to be nothing else than the fine dust carried by the wind from the great desert of Central Asia. Those who have lived in Broken Hill can readily imagine what the wind can do in piling up dust. During our dry summer large quantities of dust are carried away by wind. We can watch the progress of the sandhills on the coast at our watering places. We see fences almost covered by sand, and houses being overwhelmed in the same manner. Vegetation plays an important part in preventing the surface soil from being blown away. Our greatest dust storms occur on wide, treeless plains. In hot climates the most important agent engaged in breaking down rocks to dust is the change in temperature. In cold countries the great weathering agent is frost—intense cold. We know that water whilst changing into ice expands with almost irresistible force. If a bottle be filled with water, corked tightly, and exposed on a very cold night when the temperature falls below zero, it will be found to be cracked when examined next morning. On the Continent of Europe and North America it is no uncommon occurrence for water pipes to burst during cold weather. Almost all rocks, and especially sandy ones, are somewhat porous. They therefore absorb water. During exceedingly cold weather this water

freezes, expands, and forces particles of rock apart. When the ice melts the rock particles easily separate. Consider a lump of hard soil. Rain falls. The clod becomes saturated with water, which freezes, expands, and forces the particles apart. The clod remains as hard as a stone until the thawing sets in, when it falls to the finest powder—in a finer state of subdivision than can be obtained by any crushing machine in existence. Frost in these countries is a great tillage implement, and is a farmer's friend. When frost damages our crops we are apt to regard it as a curse rather than a blessing. It may do harm at times, but it also does incalculable good. Have you ever ascended the side of a hill in a cold climate and noticed the number of loose stones that make walking a great effort? These stones are the result of the work of frost. They have been broken from the rock composing the mountain, and are gradually working their way down the side of the hill. In Scotland such accumulations of loose stones are termed 'scree.' In humid countries the face of polished granite rapidly deteriorates. Cleopatra's Needle retained its polished face for centuries on the banks of the Nile, but on removal to London it was soon found necessary to apply a waterproof varnish to protect the surface. In Canada and the United States, and many other countries, the same precautions have to be taken to protect polished slabs. When flagstones have to be quarried it is customary for the workmen to saturate the surface of the rock with water before winter sets in, for the rock is found to split more readily along the bedding planes under the action of frost than by any other means."

(To be continued.)

Utera Plains, August 24.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. P. Sinclair (chair), A. Venning, A. Ramsey, W. Gale, W. Stephens, J. and M. Abrook, H. T. and T. C. Hornhardt, A. Barker, M. Hunt, H. Hill, H. D. Rule, G. C. Bilney, F. Braunack, R. Hill (Hon. Sec.), and three visitors.

COMMERCIAL FERTILISERS.—The following paper was read by Mr. Ramsey:—"Artificial manures are used for the express purpose of obtaining an increased yield, and thereby a greater profit. Whether the fertiliser used will yield a profit depends chiefly upon the manurial requirements of the soil and the particular crop. If the manure happens to suit the soil, climate, and conditions generally, an increased yield must result. At present the majority of farmers use phosphate because their neighbors obtained a good yield by so doing. Farmers, as a rule, know very little about their soils and the requirements of their crops. South Australian farmers are no worse than others in this respect. They use manures more profitably than farmers in the eastern States. In some parts of New South Wales they are afraid to use superphosphate. Not until several good crops have been grown in the district with super. can they be induced to use it. It is certainly a good plan for farmers to conduct experiments on a small scale on their own farms; by so doing they learn much in regard to the climatic conditions prevailing. There are several different systems of manuring in vogue in many parts of the world. No system is absolutely the best; each has its own particular merits. Ville's method assumes that plants may, as far as manures are concerned, be divided into three groups. One group is specially benefited by the application of phosphates, a second by potash manures, and the third require nitrogen in abundance. Ville's plan suggests that the dominant fertiliser should be applied in excess to the particular group. By this system wheat, rye, oats, and barley require nitrogen in excess; phosphoric acid is required for turnips, maize, sorghum, sugarcane; while peas, beans, clover, and potatoes require potash manures. This plan does not bar the use of other manures to the group of plants mentioned. It implies that, while phosphatic and potash manures may be needed by wheat, oats, and barley, nitrogen must be the plant food applied in excess. When the soil is fairly well supplied with plant food and the field is well tilled this system of manuring should give good results. Wagner's system was propounded by the German scientist of that name. According to Wagner, as phosphatic and potash compounds and most mineral constituents of soil are not likely to be leached out, whereas nitrogenous compounds are so soluble that they are easily lost in the drainage waters, it follows that nitrogenous fertilisers must be carefully used. The mineral elements are cheap, the nitrogen compounds dear. The economical use of nitrogen will mainly depend upon the abundance of phosphoric acid and potash present. When phosphoric and potash manures are applied in excess, the nitrogen must be applied when the plants are best able to make use of it; that is,

during the growing period. It is also better to use small amounts of nitrogenous manures at such times and quantities as the conditions demand. As the name implies, the analysis system is based on the analyses of plants, which tell us their food requirements. We can, from an analysis, calculate the amount of plant food per acre removed by certain crops. Different formulas must therefore be recommended for each crop, and the phosphoric acid, potash, and nitrogen are used in the proportions in which they exist in the plants. This system, although it may result in large yields, is an expensive one. A soil may be rich in phosphoric and potash, and may not need the addition of either of these plant foods to secure good results. A manure may be used without any knowledge of the conditions of soil and the crop requirements. If a good yield results, all is well; but a poor yield at once shakes the farmer's belief in fertilisers. As before mentioned, almost every farmer in this State uses a phosphatic manure. Now we know that all soils are not alike, either in chemical composition or physical condition. A sandy soil requires different treatment from that given a stiff clay. Yet the farmers apply super. to both, and oftentimes with good results. A farmer leaving the north for the southern districts expects his farm practices in the former to suit the conditions prevailing in the latter. Such a change is not so violent as one, say, from England to Australia. The Englishman has looked upon fallowing as a wasteful practice; he has also been taught to use nitrates in excess on his wheat crop. Let him try such system of manuring in South Australia and in every instance he will come out on the wrong side of the ledger. For a system to be successful the principles governing such system must be sound. Different soils contain varying amounts of plant foods. A certain soil may be lacking phosphates, but may contain sufficient potash and nitrogen to produce a maximum yield. In such cases phosphatic manures only are needed, and it would be wasting money to apply others. It seldom happens that all three plant foods are lacking at one time. A chemical analysis of a soil may indicate that all the plant foods needed by a crop are present, and in more than sufficient amounts to produce big yields for many years. Still, the conditions may be such that only poor yields are obtained. In such cases the only sensible way of finding out the proper fertilising ingredient required is to put the question to the soil. A few simple experiments could be conducted on the farm. A certain number of plots could be set aside and different fertilisers used on each separate plot: phosphates in one, potash manures in another, and nitrogenous compounds in a third. Then a combination of the three elements should be used on one plot. A check is also necessary. To be worth anything such experiments should be carried out for a number of years on the same plots. The experimental plots should receive exactly the same treatment as the rest of the field. Generally the eye will detect any difference of growth; nevertheless, it is necessary that each plot should be separately harvested and the results tabulated; and just here let it be stated that this operation must be carefully conducted. The weight of grain and straw from each plot should be carefully calculated. The result of one year's experiment must not be considered conclusive, but the average for several years will give much valuable data to work upon. No matter how many tests are carried out by the 'plot' system there are no more truthful results than those of experiments conducted on field plots. The plot system is no doubt of great scientific interest. With such experiments the conductor has almost complete control of every factor. Not so the farmer. He has little control over the field. True, he can plough and sow and reap, but further than that he is powerless. There are so many conditions to be considered on a large scale that do not present themselves in the plot system. The experimenter has complete control of drainage, physical conditions of the soil, immunity to insect or fungus pests, and the amount of plant food present in the soil. The farmer has little, if any, control of these factors when experimenting on a big farm. Farmers should not consider the use of artificial manures a panacea for all the ills to which a plant is heir. No matter how much manure is applied, the result will be poor unless the farmer works his soil intelligently, sows the most suitable wheat for his district, and destroys fungus pests attacking his plants. The constant use of artificial manures necessitates most careful farming. It means that a proper amount of humus must be kept in the soil. Where it is impossible to apply stable manure a green crop must be ploughed in the soil. As artificial manures actually supply plant foods, it follows that when such manures have been sensibly employed a soil must become richer year by year. We, in South Australia, wish to obtain maximum yields by the use of super. A time must come when our soils will be depleted of potash; we will then find it absolutely necessary to apply both potash and phosphatic manures. We use such small amounts of phosphoric acid that one is inclined to doubt whether the increased yields are due to the use of this plant food. We are certain that the farmers to-day are getting much better yields; not because they are using phosphates, but because of the more intelligent method of farming now adopted. More attention is being paid to all forms of tillage

operations, wheats are more carefully selected, and farm implements are greatly improving. All these factors tend to increased yields. We have still much to learn about farming. The Government cannot be accused of spending too much money on experimental farming." In discussing the paper, Mr. A. Venning said the farmer should dress his crops with different manures, with the idea of ascertaining which returned the greater profit. Mr. J. Abrook considered the increased return from the application of super. was proportionately greater in the case of the poorer lands than the richer. The Hon. Secretary had used fairly heavy dressings of super. with good results. Every farmer should each year experiment on his holding. Different plots should be harvested separately and carefully. It was essential also to see that any increased yield obtained was correctly attributed to the factor which had brought it about.

DRIFTING SAND.—Members were of the opinion that it was not advisable to fallow to any depth country that was liable to drift. The rubbish should be left near the surface, and this would assist in preventing the movement.

Yabmana, June 29.

PRESENT.—Messrs. J. N. McCallum (chair), N., R., and A. McCallum, J. F., J. Y., and A. Robertson, W. W. Lindsay, T. G. Strother, C. Bartel, F. Schirmer, G. W. Sharp, J. Penna, and M. K. Frost (Hon. Sec.).

FARM HORSES.—Mr. J. Penna read the following paper on this subject:—"In this district there is room for great improvement in our horse stock. The draught horse is the best to breed on the farm. I advocate the Clydesdale, as it is active, with plenty of grit and fire and abundance of bone and muscle, which is necessary for heavy carting. The selection of the sire plays an important part. Study its pedigree, and see that for generations it has been kept true to type. When characteristics have been transmitted from generation to generation they become fixed, and the good points of pure-bred sires are more likely to be transmitted to their progeny than are those of half-breeds. Size, style, conformation, and quality are points to be studied. Farmers who do not possess a stallion should patronise the best available, even if it costs a few extra pounds in service; it is money well spent. A good horse always commands a good price, while the market is glutted with weeds. A large amount of money has gone from South Australia to Victoria and New Zealand for horses, and some fine specimens have been procured; but there is still a tendency to utilise the cheap horse. This is to be regretted. Australia has the finest climate in the world for horse-breeding. Our open pastures are unequalled, but the high prices ruling during the last few years have made people careless. If we wish to hold a place in the world's market, we must keep some of our best from which to breed, and not the culls that export buyers have refused. If we go on with a downward tendency, our reputation will be lost. After breeding, feeding is the most important factor. One well-fed horse will do as much work as two under-fed animals. A foal should be well cared for from the time it is weaned. If the pasture is short a little feeding will pay. It costs less to feed a horse in good condition than a horse in poor condition. I would break colts to light work at the age of two and a half years, taking care to avoid scalding the shoulders. Too much corn often causes trouble. Working in wet weather is also a bad practice. Where it is possible, horses should be provided with a warm stable. To stand in the wind and rain all night after a hard day's work would tax the constitution of any animal. We are mainly dependent on our horses for a livelihood, and therefore they are worthy of consideration." In the discussion which followed members generally agreed with the paper, but some thought the Clydesdale was too heavy for ordinary farm work.

Yadnarie, August 23.

(Average annual rainfall, 14·07in.)

PRESENT.—Messrs. W. L. Brown (chair), J. A. Kruger, F. W. and A. A. Jericho, A. Spriggs, R. H. Parbes, F. H. Stubings, R. B. Deer, L. H. Marston, C. H. Mowat, G. B. Kobelt, H. Pearce, B. B. Crosby, J. J. Deer (Hon. Sec.), and three visitors.

INCREASING THE WHEAT YIELD.—Mr. W. L. Brown read the following paper on this subject:—"In South Australia the average yield is low when compared with that of England or New Zealand. Occasionally there is a grower who obtains 40bush. per

acre, but this is an exception. The usual thing is an 8bush., 12bush., or 15bush. average. The agriculturist in this country has difficulties to encounter. Drought, disease, and poor markets have given the wheat pioneer setbacks. The appreciation by the average farmer of improved methods is necessary to increase the yielding capacity of the land already occupied and under cultivation. Every farmer does not recognise the value of artificial fertilisers, or make following a general rule, or put into practice an intelligent system of crop rotation, or obtain the best seed of the variety best adapted to his soil. To ensure the value of an experiment, a careful account should be kept of the labor and cost, so that it may be seen, when the plot is harvested, what the result is financially. One acre yielding 20bush. is more than twice the value of two acres yielding 10bush. each, because the labor is decreased by half. It is this that induces the grower to prefer the careful cultivation of 100 acres to the careless cultivation of 200 acres." In the discussion which followed, members thought that more phosphates could be used to advantage in this district, and that the methods of cultivation could be improved.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Coonalpyn. July 27.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Wall (chair), Gurner, G. E. and R. F. Venning, Bone, Hill (Hon. Sec.), and one visitor.

FIREWOOD.—In a short paper on this subject Mr. T. H. Wall expressed the opinion that the price of wood to the consumer was too high in proportion to the rate paid to the man on the land for it. Although some months ago the rail freights were reduced, there was apparently no direct benefit to the retail purchasers or the farmers. The wholesale wood merchants were offering 8s. 6d. per ton on trucks, Coonalpyn, for roots at the present time. The rail freight per ton to the city was 6s. 11d., which brought the price of the roots to 15s. 5d. on trucks, Adelaide. whilst the consumer was asked to pay from 28s to 30s. per ton.

Forster. August 3.

(Average annual rainfall 10½in.)

PRESENT.—Messrs. C. Hayman (chair), J. Searle, J., F., and W. Johns, J. G. and R. Whitfield, W., T., and H. Searle, E. Towill, C. P. Payne, W. J. Sears (Hon. Sec.), and one visitor.

THE AGRICULTURAL BUREAU.—Mr. J. G. Whitfield read the following paper on this subject :—" We often hear the question, ' What is gained by attending Bureau meetings ? ' In my opinion a great deal is gained, especially by the young men. If all members attended regularly, brought their friends with them, and took more interest in the meetings, they would soon find that a great amount of good was being done throughout the State. They would get practical hints on all branches of agriculture from State agricultural advisers, professors, veterinary surgeons, and practical farmers, whose views should greatly help all classes of men if they are anxious to learn. The value of this interchange of ideas, experience, and observation to each individual member of the Bureau and to the State as a whole, cannot be overestimated. I would advise our young men (I am glad to know we have several in our Branch) to take a deeper interest in all matters that come before the meetings. They may not just now appreciate the benefits, but in later years they will wish they had given them more thought. Some will no doubt continue farming. Consider now the advantages you have in the practical advice you get through your *Journal*. I say your *Journal*, because you not only have reports of your own meetings published, but of all the meetings held throughout the State, and this should enable you to gain a greater knowledge. In years to come it will be a great help, not only to yourself, but also to those with whom you are associated."

Geranium, July 27.

PRESENT.—Messrs. R. L. Jacobs (chair), Lang, Reed, W. J. Mitchell, Wendelbourne Hammond, Dohnt, and W. Pannell (Hon. Sec.).

HORSES.—An interesting address on the subject of common ailments of the horse was delivered by Mr. R. L. Jacobs, in which he stated that to the experienced horseman the general appearance of a horse immediately betrayed the state of its health. When an animal was in good health it stood erect and squarely on all four feet, and there was an easy rythmical movement, and an apparent even distribution of the weight of the body over the feet. The appetite was good, and when in the paddock the animal would be continuously grazing. The coat should present a sleek appearance, the ears being alert and evenly pricked up, and the eyes bright and glistening, without being excessively moist. The normal temperature of a horse was 100° to 101°, the pulse 36 to 40, and respiration between 12 and 16 to the minute. Without knowledge of the normal conditions, it was not possible to accurately diagnose in the case of sickness. Horse-owners should not be in too great a hurry to dose the cases. The history of the trouble should be carefully studied. The causes of various complaints, together with the simplest means of curing same were dealt with, and stress was laid on the necessity of prevention.

Hooper, August 14.

PRESENT.—Messrs. J. R. Beck (chair), A. Macdonald, G. G. Pitt, C. S. Hall, E. G. Colton, W. N. Pearce, W. J. Pearce, E. O. Brown, A. W. Lawrie, C. B. R. Wright (Hon. Sec.), and two visitors.

MIXED FARMING.—The following paper was read by Mr. C. S. Hall:—"It is a serious mistake for a farmer to confine his energies to the growing of cereal crops alone. Some scheme of mixed farming should be adopted. In starting in new country, I would advise the following scheme:—When the farmer has his crop in, he should plant ornamental trees about his homestead, and clear and grub an acre or two for fruit trees, lucerne, and vegetables. He should select a spot as well protected from the wind as possible, and one that can be irrigated. The fruit trees should be planted on a slight slope. A fair amount of attention is necessary for the welfare of the trees for the first few years, but, when they are well established very little time need be given them. Lucerne should be planted in a good depth of soil, free from stumps. The ground should be well stirred up before the seed is planted, the best time for which is August. A good dressing of farmyard manure should be applied, and bonedust should be drilled in when sowing. The land should be well drained, for if water is allowed to remain on it the result will be detrimental to the growth of the lucerne. Most vegetables can be grown here, especially tomatoes and melons. These need little attention, but pay well. No farmer should be without a few head of poultry. Pure-bred birds pay best. If the birds are coarse about the head they will generally be poor layers. They should be fairly broad at the back, compact, low set, bright, and active. They will do much better and lay better if shut up. The yards should be well protected from the wind, with natural shade provided. They should face the east, and a warm house should be in each yard. Testing of hens is a practice which should be adopted. Keep the rooster away from them, except at breeding-time, for they do better, and the infertile eggs keep better. Feed a pollard mash in the morning, greens at mid-day, and grain at night, and give fresh clean water regularly; also provide plenty of grit and litter. Pigs are profitable. A good strong wire-netting yard and warm sties should be erected. Cracked grain, well soaked, makes suitable feed. If the grain is given dry, it should be crushed. The pigs do well on piemelons. This country is not suitable for breeding on a large scale, but every farmer should have one or two pigs. Sheep, of course, are a very profitable source of income, and every farm, once established, should have a small flock of them. Mallee roots are an asset to those farmers who are within a reasonable distance of the railway, and it is a great mistake for those so placed to burn the roots."

Monarto South, August 23.

PRESENT.—Messrs. G. Patterson, (chair) A. Patterson, R. E. Anders, A. P. Braendler, J. and H. Frahn, G. Gogal, J., E., and R. Hartmann, A. Harper, H. Hein, E. Kuchel J. G. H. and G. H. Paech, A. Schenscher, C. Thiele, G. Thomas, J. Daly, C. F. Altmann (Hon. Sec.), and six visitors.

PREMIMMA WELL.—In a short paper the Chairman dealt with the proposal to connect the Premimma Well by a pipe with the main road, a distance of about one and three-quarter miles. He contended that if this were carried out a great deal of trouble and expense would be saved those who had to cart water, and he supplied the following estimate of the cost of the work :—9,240ft. of 1½in. galvanized piping, £217 2s. 9d. ; two 3,000gall. tanks, £21 10s. ; windmill, £25 ; railage, £5 ; carting, erecting, and laying pipes, £6 ; ball taps, stands for tanks, sundries, £6 ; a total of £280 12s. 9d. If 1½in. piping were used the cost would be reduced to £226 12s. 9d. Members generally agreed that the estimate supplied was somewhat low.

Morgan, August 24.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), E. Hausler, O. Hausler, R. Wohling, jun., E. French, J. Heppner, J. Pope, and H. Wohling (Hon. Sec.)

HORSE FEED.—Mr. R. Wohling, jun., read a paper, in which he stated that the farmer in the Morgan district would be well advised to set aside about 40 acres of good land for the purpose of growing hay. Loose and sandy soil was better than clay, as the crop would not grow in the latter during the cold weather. However, this could to a large extent be remedied by the use of super. Feed for five horses for 12 months had cost £82 15s., and he was of the opinion that if he had grown the feed himself the expense would not have been so heavy. Mr. French, in discussing the paper, recommended the keeping of cocky chaff and straw for use in bad seasons.

Parrakie, August 24.

PRESENT.—Messrs. F. J. Dayman (chair), A. J. Beelitz, H. Deiner, C. Heinzel, O. Heinzel, W. Threadgold, F. W. Randall, F. W. Gravestocks, A. F. Dayman, J. Temby, C. E. Hammond, R. L. Beddome, J.P., R. E. Jose, F. S. Dayman, M. Kildea, N. Good, T. Lewis, M. Cooney, T. Willis, J. Oharo, A. Heinzel, S. R. Good, A. S. Johncock, A. C. Hameisten (Hon. Sec.), and seven visitors.

FRUIT AND VEGETABLES.—Mr. A. J. Beelitz read the following paper :—It would pay every farmer to put in about 50 fruit trees and about 200 vines on a piece of soil cleared and well ploughed with a share plough. The fruits should be planted about 20ft. apart each way. As the district is inclined to be very frosty, I prefer them at the foot of a sandhill on the south side. Vines should be brought well up from the ground, and planted about 10ft. apart each way. The farmer should also put in about one acre of water melons, and one or two acres of pie melons, pumpkins, &c., which grow remarkably well and make good feed for cows, pigs, and poultry, and are suitable also for household use. These should be planted at the end of September or beginning of October, in rows about 6ft. apart, on a piece of fallow land, protected from north winds and drift sand. A plot of cucumbers and tomatoes, grown on land well dressed with stable manure during the winter, dug down, and another dressing applied before planting, would mean a big saving in the greengrocer's bill."

Pinnaroo, August 17.

PRESENT.—Messrs. B. L. Harfield (chair), A. U. Burman, F. G. Bonnin, J. Docking, H. E. Dibben, F. H., P. J., and R. Edwards, L. M. Ferguson, F. Hunt, H. C. Hill, W. H. and M. Kelly, H. Ledger, C. Lee, J. Letheby, F. Laycock, M. McCabe, E. H. Parsons, A. I. Reed, C. A. E. Schiller, J. Scales, W. Venning, L. H. Wright, W. Wilson (Hon. Sec.), and four visitors.

STRIPPERS AND HARVESTERS.—Two members contributed papers on this subject. Mr. R. Edwards said—"I consider the stripper more suitable than the harvester for anyone farming on anything like a large scale in this district, but where a farmer is doing his own work it is probable that the harvester is more suitable ; at least one man in this district last year took off over 250 acres single-handed with one harvester. This could not be accomplished with the stripper, as this necessitates at least two men at the winnower ; but where a large area is to be dealt with I favor the strippers and a power winnower. The winnower can stand in a convenient place instead of being hauled about all over the paddock, as is the case with the harvester. This is a big consideration in a

light, sandy soil such as we have here, which makes it necessary to save every pound of haulage possible. There is more waste with the harvester. The stripper can only waste off the comb, but the harvester has the comb waste and that of the riddles, and on some machines there is leakage from a number of other places as well. It is impossible to avoid some waste off the riddles where there are stumps in the ground, as the pace cannot be kept even. When the main wheel comes down off a stump it must quicken the speed of all the machinery, and wheat is often thrown off the sieves in consequence. It is also said that the harvester distributes a lot of rubbish over the ground, as when a sufficient blast of wind to properly clean wheat is being maintained in the winnower it is quite strong enough to blow small seed, wild oats, &c., over the tail. Perhaps the most important argument in favor of the stripper is the saving of the cocky chaff, which in a season such as we have just passed through is a valuable fodder. A fair supply should always be kept on hand in case of a poor season. Chaffsavers can be attached to harvesters, but as far as I can learn they are anything but satisfactory and entail a considerable loss of time. The harvester advocate will say it is a big advantage to have the wheat cleaned as it is taken off, which fact I freely admit; but the best method is to strip the crop, have the winnower in the paddock, and clean the wheat as it comes in. A cloth should be placed at the elevator of the winnower and the strippers emptied on to this. Do not heap the wheat and clean it afterwards. There is too much waste caused by the sandy floors and rain. By adopting the above method the cocky chaff is carried from the machine and placed in large heaps convenient for covering with straw, to be kept dry for the stock when necessary. If a chaffsaver is used on a harvester, which is rarely the case, the chaff is deposited in small heaps, and a considerable amount of time has to be spent in carting or throwing it into a large stack. Then there is the question of labor. The harvesters can be worked with less labor than the stripper, but it is more expensive and harder to get. It is difficult enough to obtain a man competent to drive a stripper, but it is infinitely more difficult to obtain one who can be thoroughly trusted with a harvester, and a higher wage is usually demanded. The labor saved will not amount to much, after allowance has been made for the extra wages, horses, horsefeed, and extra tackling necessary to work three or four harvesters." Mr. C. Lee stated that with the increased size in the areas cropped, improvements in the harvesting machinery were necessary. The scythe and sickle were followed by the stripper and winnower, and then the motor winnower. Continuing, the paper said, "The troubles that confront the farmer to-day are those of wages and the difficulty of securing competent workmen. The harvester fairly meets these difficulties, as can be shown. One man with four good horses can reap, clean, and bag in a fair average crop, say, about 50 bags a day. Allowing £2 10s. per week for his wage, the crop could be taken off at the comparatively low cost of 2d. per bag. It will only cost him 4d. per bag to reap, clean, and place same ready for market. The cost of feed and chaff would be the same with the harvester as with the stripper. The average price for cleaning by motor would not be less than 3d. per bag. The cost of harvesting with the stripper and winnower can be set at 5d. per bag. The difference would amount to a fair cheque on some of the farms in Pinnaroo in a good season. The fault attributed to the harvester is a waste of chaff, but a chaff carrier can be very cheaply made and fixed on the machine. I have worked harvesters for two seasons and have had no trouble with chaff getting into the bags when the machine is stopped and started in the crops, or in turning corners. There is not so much chaff in the wheat as is the case with the hand or motor winnower. Harvesters, if properly looked after and kept oiled by the man in charge, are little, if any, more trouble than strippers. In the former there are two machines working in one, and there is bound to be wear and tear. The saving to the farmer more than pays for extra parts. There is less waste with the harvester than with the stripper, even when dealing with a low crop. The harvester will take much better than the stripper a crop that has gone down by wind and rain." A lengthy discussion followed. Mr. McCabe favored the harvester, as the farmer could start operations two hours earlier than when using the stripper. The harvester was often said to be the means of "fouling" the land, but he had seen properties equally as dirty before the introduction of the harvester. Mr. Venning said that when the cleaning was done by power winnower there was nothing to prevent a stripper starting as early in the day as a harvester. Mr. Docking did not think sufficient improvements had been made in the harvester to justify its place on a farm. If the grain were put in a heap before cleaning a stripper could commence operations at least 10 days before the harvester without any harmful results. Mr. Schiller conceded that the harvester was a labor-saving machine, but emphasized the fact that its handling required a thoroughly competent man. While the average farm hand could work a stripper, it was not so with the harvester, and experienced hands were not always easily secured. He

avored the stripper. There was not much waste grain when it was put into heaps if it were cleaned up early and care were exercised when bringing the stripper in for the purpose of emptying. The saving of "cocky" chaff alone was an important factor, as when mixed with crushed corn this by-product was of immense value for stock feed. Mr. W. H. Kelly had been farming for 50 odd years, and had never found reason to condemn the stripper. An important point in connection with these machines was their simplicity. The only wheat lost was that from the comb. The harvester not only distributed it in this way but also blew and shook it out. He believed the stripper had come to stay, but the harvester would soon be laid aside. Mr. P. J. Edwards had always used the stripper and motor winnower, but was of opinion that a great deal was to be said in favor of the harvester. The saving of labor was a very important item to the farmer of to-day. By the use of the harvester a crop could be gathered and cleaned by just so many men as would be necessary for the driving of the machine. It took three men to work a motor winnower when fed by four strippers in a good crop, and a less number of strippers would not keep a winnower fully supplied. The motor was not sufficiently simple for the average farmer to understand and manage. Some members had had trouble in respect to their motors, and were greatly inconvenienced thereby. Other points to be taken into consideration were that the motor required benzine and a liberal supply of oil. Mr. Ledger was accustomed to the use of stripper and power winnower, but recently had been seriously contemplating a change. He attached little importance to the loss of seed; the saving of cocky chaff was perhaps the most vital point. Strippers were not desirable on small farms. Mr. Parsons questioned whether it would not be possible for two farmers in a small way to share the machinery, and so harvest by this means. Members thought such a scheme as this was hardly practicable.

Renmark, July 23.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. H. DeWitt (chair), J. S. Huggins, H. S. Taylor, H. D. Howie, R. Nuthall, C. J. Everard, M. B. Genest, L. L. McDougall, F. Basey, F. Cole (Hon. Sec.), and one visitor.

PRUNING DECIDUOUS TREES.—It was stated that Mr. Laffmann, late of the Victorian Department of Agriculture, believed that the leaders of fruit trees should not be shortened back, as a cut back leader invariably forced strong growth. By removing the shoots altogether, better results with the fruit spurs on the lower limbs of the tree would be obtained. Mr. Howie had had satisfactory results from apricot trees treated in this way. Mr. Everard had seen some trees in Adelaide on which strong growing leaders were tied down instead of being shortened back. The results were said to have been very good.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, July 23.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. Chapman (chair), C. Ricks, C. Lewis, A. Broadbent, A. Jacobs, J. Tozer, H. Jacobs, A. R. Stone, E. Broadbent, H. Lewis, T. Jacobs, jun., J. Lewis, T. Jacobs, G. Hicks, J. Mildwater, S. H. Curnow (Hon. Sec.), and one visitor.

EXHIBITS.—Mr. Ricks tabled some samples of Berseem clover which had grown, with the aid of irrigation, to a height of 8in. He did not think the clover, as an early feed, gave any better results than barley. He intended, however, making a sowing in December, and irrigating by means of sprinklers.

BUSH FIRES ACT.—Mr. T. Jacobs initiated a discussion on this subject. He considered that it was absolutely necessary that the Act should be amended. It was very suitable for the North, but it did not meet the requirements of the Hills districts. He read extracts

from the 1885 Bush Fires Act, clause 4 of which said that no fire should be lighted for scrub-burning during the months of November, December, or January, on pain of a penalty of £50. It was an exceptional year when a scrub fire would run in the grass and do damage during December. If the scrub could have been burnt in October and November, when it was quite safe, the disastrous fires of last summer would not have occurred. Residents in the Hills districts should be allowed to burn in the night time, as the fires then burnt more steadily, and were consequently under better control. Mr. Ricks agreed, and suggested that the Act should be amended to allow of landholders in the hills burning scrub during November, February, March, and April, during night or day. Mr. Jacobs said that much of the hills scrub went for years without being burnt, simply because it would not burn satisfactorily at the time allowed in the Act. During the many years he had lived in Cherry Gardens he only remembered one grass fire. Other members spoke in favor of an alteration in the Act. Members then discussed the possibilities of organisation for the purpose of controlling bush fires. Messrs. Stone and Mildwater agreed that good work could be done in this way. It was suggested that several of the best bushmen in the locality should be accepted as leaders, and the whole of the fire-boaters should act under their directions. It was felt that much valuable property could be saved in this way.

Hartley, July 27.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), J. F. Tydeman, J. M. Hudd, W. Bermingham, W. Brook, S. Pratt, W. Richardson, G. Hill, H. G. Phillips, J. Stanton (Hon. Sec.), and one visitor.

QUESTION BOX.—A number of questions were dealt with by members. It was thought that slides were better than wheels for fixings for harrow swings; and members unanimously agreed that more satisfaction was gained from chaff when fed to horses than was the case if the hay were fed long. The majority of those present considered it did not pay to insure mares about to foal, and for the treatment of sore shoulders in horses it was thought advisable to keep the shoulders clean and place a bran bag under the collars when the horses were working.

FARM LABORERS' BLOCKS.—Mr. J. M. Hudd, at the June meeting of the Branch, read a paper in which he set out his reasons why the proposal to survey small blocks of land to provide holdings for farm laborers was impracticable.

Lyndoch, August 22.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), A. Klaube, E. J. R. Woolcock, H. Springbett, J. Linke, H. Kennedy, P. N. Burge, W. F. Haesc, J. Mitchell, G. W. Warren, E. Filsell, and J. S. Hammatt (Hon. Sec.).

SAND IN HORSES.—Mr. H. Springbett remarked that he had successfully treated horses suffering from the effects of sand as follows:—A drench consisting of one handfull each of coffee and sugar and three-quarters of a pint of water brought to a boil was put into a one and a half pint bottle, which was then filled with new milk, was given. For the next two days the animals were fed with chaff and pollard.

Meningie, July 27.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Mincham (chair), Hiscock, Ayres, A. and F. P. Dainty, A. and E. Pettit, Hill, Court, Williams, I. and I. R. Coad, Yates, Tregilgas (Hon. Sec.), and seven visitors.

WINDBREAKS.—In a short paper on this subject Mr. A. Dainty drew attention to the necessity of growing hedges in this district. Whilst the boxthorn, the briar, and the urze were suitable for this purpose, the difficulty was that these plants spread so rapidly that they soon got out of control, and there was every indication that the first named would be a great curse to landowners in the district within a few years.

Mount Barker, July 25.

(Average annual rainfall, 30-96in.)

PRESENT.—Messrs. J. Brinkley, H. and F. Treleaven, A. Ferguson, C. Crompton, F. H. Follett, F. von Doussa, F. Simper, Jas. Cleggett, J. Morris, H. and B. Pope, G. Milne, R. H. Grimes, J. Thomas, J. Smith, H. N. Bell, A. P. Herbertson, L. Cornish, B. Stephenson, J. Fidler, S. J. Bishop, D. L. G. Monfries (Hon. Sec.).

THE SILO.—Mr. D. L. G. Monfries read the following paper:—"In introducing my paper on 'Silos and their Advantages,' I wish to state that some of my remarks may seem contrary to the theory that some of you, no doubt, have gleaned from articles published on this important subject; but my paper is going to be a practical one, and not a theoretical one. There are three kinds of silos—stack, overground tub, and pit silos. As I am not very well acquainted with the tub silo, which is used extensively in Canada, I will have nothing to say on this particular style. The stack is favored by some mainly. I think, because it does not cost the farmer as much to put his silage down; but I feel quite confident that the silo for us is the pit silo, as there is nothing like the heavy handling, nor the waste round the edges of the stack. The pit silo, if possible, should be constructed in the side of a hill. This does away with heavy pitching of green stuff, and there is no trouble in getting it out when ready for feeding purposes. I favor a pit of about 13ft. square and 15ft. deep, which will hold enough ensilage to feed 20 cows for about four months, that is allowing each cow one cubic foot per day, or in weight 40lbs. to 45lbs. This, of course, assumes that the cows are allowed to graze as well. Build the silo of brick, cemented over, with the corners rounded off, to enable the fodder to be well tramped, which is a most important factor in making good ensilage. In the case of right-angle corners, tramping is most difficult, and this is usually where, together with the sides, the most waste occurs. Have a door-frame built in the lower side, where slabs can be fitted, one above the other, till the frame is completely filled in. When this is done it is advisable to paste sheets of unbleached calico on the slabs to prevent air getting between them and thereby spoiling any silage. A sliding roof is also a good idea, as it can readily be moved during filling and pushed back afterwards. A great advantage of silos is that during years of plenty, fodder that otherwise would have wasted may be saved for droughty periods, as ensilage will keep for years. Silos in America are termed (and rightly so) the farmers' 'save all.' Our own silo is of the size mentioned earlier, and is only 3ft. above the ground at the top (the filling side), and 4ft. 6in. in the ground at the lower side; consequently it reduces the handling to a minimum. Any green stuff will make ensilage, but the better the fodder put in the better will be the outturn. True enough, stock will eat ravenously variegated thistles, artichokes, and any other weeds when made into ensilage, but whether they do as well on it as on other good fodders is quite another thing. Maize and Indian corn, sorghum, and horse beans are used with great success, but the best crop is reaped from a sowing of 2bush. of oats, 8lbs. of vetches, and 20lbs. of peas to the acre. Lucerne and clover make capital ensilage. Our winter is very cold, and where we can keep 40 cows in the spring and early summer, we cannot keep 10 during the winter unless we make provision for them. By conserving fodders and native grasses, which would otherwise lose all their nutritious values and be of no use whatever, we can keep our cattle in good healthy condition. Crops for ensilage should be cut before they get too ripe, and in the case of oats, peas, and vetches, I favor cutting just as the oat head comes out. By that time the peas are nicely in pod, and the vetches about the height of the oats. The stems of the oats are not hollow, and therefore there is an absence of air, and the fodder is not so liable to go musty round the edges of the pit as is the case when cut riper. Lucerne should be cut when it is just coming into flower, and it then makes ensilage of exceptional quality. When filling the pit there is absolutely no necessity to work at express speed, as filling steadily is just as good, and the ensilage, when taken out, is of quite as much value. A great advantage ensilage has over hay-making is that one can go on filling the silo irrespective of wet weather, as this does not in any way hurt the silage. In the case of hay it would simply spoil the crop. An average crop of green stuff yields from 6 to 9 tons per acre, and the same crop cut for hay would yield from 30cwt. to 2 tons. With the exceptional feeding qualities that ensilage possesses, especially in the production of milk, everything is in favor of the latter. The cattle are more fond of it than they are of hay. Care must be taken in filling the pit to keep the corners and edges well tramped, otherwise the air will get in and spoil a great part of the food. The middle, of course, is not so liable to spoil, but the whole surface must be looked to in this regard. Most persons believe in chaffing the fodder, but where a farmer intends feeding in the fields it should be put in long, as it is not so liable to waste, and cattle will eat up every scrap. Do not let the temperature of the silage get below 80°, or over 115 degrees Fahr. A simple, yet effective way of finding out if silage is about the right

temperature is to push a sharp piece of iron down into it, and leave it there for some time. If, when drawing it out, it is too hot to hold, there is too much heat in the silo. If, on the other hand, the iron is only just warm, it is too cold. To get the silage cooler tramp it well, or add weight. To get it warmer let it stay for a day or so and do not cart on to it. A load of any old weeds, with a load of earth thrown on top of them, and weighted with timber, is an excellent means of covering the pit. By doing this, if any is spoilt, it is never more than the layer of weeds. Roughly the cost of carting, cutting, and filling is about 1s. 6d. per ton. Ensilage can be fed at any time after six weeks from being filled, or it can be left as long as desired. During summer it is a preventive against dry bible, and I have seen times when people were losing their cattle all round, while those feeding on ensilage did not have one case among their herd. I believe dry bible is caused through nothing else than feeding with all dry and no green or succulent matter, and I advise all farmers to try this method of saving their surplus green stuff. Less will then be heard of cattle dying during the winter." In replying to a number of questions, the writer of the paper said it was advisable to chaff maize for ensilage. Whilst cattle would readily eat Scotch thistles when made into silage, this was not the best fodder to put in. It was necessary to weight the pit sufficiently to keep the feed down and the air from getting in. The sweetness or sourness of the outturn was attributable to the temperature at which the silage was kept. A temperature of from 130° to 150° Fahr. would ensure sweet ensilage, but it would be sour if the temperature were from about 80° to 120°. He made a practice of feeding a little chaff with the ensilage. The approximate cost of a pit of the dimensions mentioned in the paper was £85. When the crop was simply stacked, trouble was experienced in weighting. It was not necessary to reweight the pit every time it was used, as by the time the contents were ready for feeding they were set quite hard. Whilst it would be found that some cows would not take to it readily, there was no doubt that it increased the milk supply, and the animals grew to be very fond of it. It was not necessary to damp the fodder in the summer, as there was an abundance of moisture in the crop if cut at the right time. Making ensilage was an excellent way of ridding the land of wild oats.

Narrung, August 24.

PRESENT.—Messrs. Thacker (chair), Sullivan, Barker, Hackett, Williams, Gardener, Critchley, Richards, E. L. Goode, J. and S. E. Morgan (Hon. Sec.), and one visitor.

LUCERNE.—Mr. Bolger contributed the following notes on the cultivation of lucerne:—"Prepare the soil thoroughly by ploughing it deeply and then harrow it down very finely; also roll it well to make a firm bed. Lucerne sown through a drill does best. Sow about 12lbs. to 15lbs. of seed with about 40lbs. of bonedust per acre for cutting purposes. If for grazing, sow about 6lbs. of seed mixed with barley or oats. Lucerne should be sown late in July or early in August, unless put in with a crop, when June is suitable, as the crop protects it from frost. When it is grazed the stock eat the heart out and it becomes very thin. The best seed to use is Hunter River broad leaf. It matures quicker and yields a far heavier crop than any other. Reserve a small plot every year for seed, as seed grown locally is acclimatised, and this means a good deal. It can be stripped with an ordinary stripper. Lucerne prefers deep, loose soil, but will grow well on almost any soil, especially in limestone country. It is one of the finest fodders, especially for dairy cattle. It should be cut one day and used the next; it will then not taint the milk. It is also good for horses as chaff or hay. Breeding sows, fed with a small quantity just before farrowing time, give more milk, and this is very important, as young pigs cannot have too much milk. Where lucerne can be grown in large quantities it will pay better than any other crop. As much as 4cwts. of seed has been taken off one acre. At 1s. 6d. per pound this means a big return, and for hay as much as 10 tons per acre has been cut. Irrigating lucerne will pay well when there is a good supply of water available. Stable manure should be put on as the crop is cut. If it is being irrigated turn the water on at night, not in the day time unless in cool weather." In discussing the subject Mr. Hackett said that if lucerne were sown with the hay it had a tendency to spring up too high, and when the crop was cut the lucerne died back. Where horses had been fed exclusively on lucerne, trouble was experienced with worms. Beef fattened on this fodder did not keep as well as that topped off on the natural grasses. Mr. Jas. Morgan thought 7lbs. per acre quite heavy enough for seeding. Where the seeding was too heavy the plants could not gather sufficient food to enable them to get down to the moisture. It was therefore better to sow less, and, if necessary, add to the crop by broadcasting seed when

the roots of the plants were well down. Lucerne fed to cows before milking left a taint, but when fed after this was not noticeable. Turkestan did not give good results in the district.

Strathalbyn, August 2.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. J. W. Fischer (chair), T. Collett, E. Hall, W. Knight, F. S. Traeger, W. Springbett, and J. R. Rankine (Hon. Sec.).

CARE OF HORSES' SHOULDERS.—The following paper was read by Mr. Springbett :—
 “ In submitting this paper to you I am not laying down any hard and fast rule as to the care of horses' shoulders, but give just what my own experience has taught me. The horse is man's best servant, and therefore it should claim the best attention. There is no time at which it needs more care than when it is first put to work. The shoulders of a horse have to stand the brunt of the work, and they are to the horse as a man's hands are to him. The care of the shoulders should begin as soon as the collar is put on. Do not work a colt for more than a couple of hours the first time it is put to it, because it will sweat very much, especially under the collar. Overwork causes the shoulders to scald and blister, and if not well looked after they become sore. Bathe the shoulders with cold water as soon as the animal comes in from work ; or better still, use wattle bark tan, which is made by chopping up a little bark and boiling it in a saucepan with enough water to cover it for an hour ; then strain it, and when cold it is ready for use. Another important point is to use good collars, and I prefer them leather lined. It is better for them to be on the small side than large. The colt can be worked longer each day, and by the fifth or sixth day it can be put to work for a whole day. Watch the shoulders very carefully when breaking in colts, and if there is the least sign of a lump or blister, spell them until they get well again. Once let the skin break and it will take longer to cure and always leave a mark. Some will object that they haven't another horse to take its place ; so the colt is worked on right through the season—seeding or harvesting, as the case may be—to finish up with a raw shoulder, which perhaps has become chronic. This difficulty can easily be overcome if it is in the seeding, ploughing, or cultivating time, by taking off one share of the plough or a couple of tines from cultivator, or working them to a less depth. I would sooner work with a horse less, doing the same work, than work a colt with bad shoulders. Prevention is better than cure every time. If the skin does not break the first week there is not much fear of it doing so afterwards. Any person working horses with sore shoulders is breaking the law. Free horses are more subject to sore shoulders than slow ones, because they sweat more. I find it a good thing to tie a free horse back, and not let him work too hard.”

SOUTH-EAST DISTRICT.

Frances, August 3.

PRESENT.—Messrs. J. C. Brown (chair), Carracher, Meehan, Watts, Baldock, McGillivray, Tompkins, Cooper, Atkinson, W. J. Forster, B. F. Feineler (Hon. Sec.).

SHEEP FOR BINNUM DISTRICT.—Mr. J. McGillivray read a paper on this subject, in which he said—“ The sheep that will pay best to keep on Binnun is the highest class Merino, a fairly plain bodied sheep, with plenty of fold in front, carrying an even wool of good staple, bright and fine of fibre, with any amount of serrations. The finer woolled the sheep the better will it stand the heavy and continuous rainfall and the hot summer of the district. A few years back the Vermont was introduced into the States, and for a while it was a great favorite. The cross undoubtedly weakened the constitution of our sheep, while the excessive wrinkles caused many of our breeders to hark back to the plain bodied animal, and this they were unable to do without sacrificing the original type of bright, fine, lustrous wool with which Tasmania was so long identified before the advent of the Vermont. The class of wool which should and can be grown on Binnun

is the fine Merino. The district will not grow cereals, except perhaps on very small areas in isolated cases. The country is not good enough to profitably raise fat lambs. The cross breeds of sheep return too light a fleece on our light soil. The north of Adelaide Merino, with its coarser fibre and long, loose staple, cannot withstand our continuous heavy annual rainfall. The close and fine-woolled Tasmanian Merino of a few years back, deep of body, short of legs, of good constitution, and almost impervious to wet, is undoubtedly the sheep most suitable for this district." Members generally agreed that more feed and attention were required by sheep carrying a heavy cutting quality fleece, but the results warranted the extra trouble and expense. Sheep in the Binnun country tended to yield a light wool, but the higher prices received for the clean, soft fleeces counterbalanced the loss of weight. Mr. Meehan favored the progeny of Merino ewes crossed with Lincoln rams. The crossbreds and the Merinos did not do well when running together.

Keith, July 27.

PRESENT.—Messrs. Morcombe (chair), Makin, Thompson, Pearson, C. B. Godlee, Hutchings, Fulwood, MacIntyre, Ton, Leishman, Dall, J. A. Lock (Hon. Sec.), and three visitors.

HORSES.—Mr. Makin read a paper on this subject, in which he stated that the best horse for farm work in this district was the medium draught, with plenty of bone and a good action. For breeding, the best sire procurable, not too large and with a good action and style, should be obtained. For roadsters he preferred an animal from a draught sire, with a small head and good action, crossed with a good blood mare. He recommended all farmers to breed their own stock, as it took several years for horses brought from northern districts to become acclimatised. Horses from the South-East were liable to get greasy heels, and their hoofs cracked and broke on the stony ground. In the discussion which followed, Mr. Dall said July was the best time for a mare to foal, as the foal would be ready for weaning when there was an abundance of feed. Mr. Fulwood preferred a clean-legged horse for farm work. Members generally thought that horses bred locally were the best for the district.

Kybybolite, July 25.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. Bradley (chair), G. H. Hahn, C. Hahn, A. R. Scholz, Koth, Lacey, Anderson, Duffield, Schinkel, A. Bradley, jun., C. H. Scholz (Hon. Sec.).

SHEEP-FARMING.—Mr. E. C. H. Schinkel read the following paper on this subject:—"In this district, which is very suitable for the production of first-class Merino wool, sheep-farming does not receive the attention it should. Sheep are not bred for wool-producing purposes alone, many farmers breeding entirely for the export trade; but on the light land around Kybybolite we need not interest ourselves in the latter, as the district is unsuitable for the raising of a carcass fit for export under present conditions. Very few farmers in this district keep an established flock of sheep, nearly all of the flock being for speculative purposes. After a succession of crop failures farmers must realise that a flock of 300 or 400 good bale-filling Merinos would be a great standby. The tendency seems to have been for extensive rather than intensive cultivation, and with too little regard for a good sound flock of sheep. In establishing a flock the class which best suits the country must be ascertained. The required number of ewes should be procured from the man with the best flock in this or a neighboring district, where sheep are raised under similar conditions; and the best method of keeping these sheep in sound condition should be ascertained. In the selection of rams great care should be taken that all are of an even type and quality. This alone is not a guarantee of success. The most important fact is the health of the sheep. It is only the well-nourished and healthy lamb which can be expected to make a good sheep, and to effect this the mother must be in a healthy condition and have an ample supply of milk. This is one of the difficulties experienced in the rearing of early lambs, when there is no green grass about. Owing to the lateness of the rains the season just past has been a striking example. By always having a well-established summer fodder crop, such as kale or chou moellier, this difficulty is very easily overcome. A well-established crop of kale will survive the driest season. This was my experience last year, which was an exceptionally dry one. In this district, where at the best time of the year not a great amount of nourishment is supplied by the natural grass, the growing of fodder crops for summer feed is essential to the success of

sheep-farming. The healthy condition of the sheep is best maintained by a judicious method of feeding. The farm should be subdivided, in order to allow a frequent change of pasture to each flock. Care should be taken not to overstock. An important factor is the constant feeding of salt and sulphate of iron to the sheep. Half a ton of salt and lowt. sulphate of iron will last 300 to 400 sheep for 12 months. This will cost about 30s. Watering from wells or bores is decidedly preferable to watering from dams or swamps, as in the latter case disease is more likely to be contracted, and in the former minerals supplied in the water are very helpful in keeping the sheep in health. Sheep not only yield wool, but we soon find that it is necessary to sell some of the ewes to make room for the lambs coming on, and a return is secured from this source."

Millicent. August 13.

(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. G. Mutton (chair), H. F. L. Holzgreffe, J. Bowering, J. J. Mullins, H. Hart, H. Oberlander, T. Edgecombe, W. Downs, and H. Day (Hon. Sec.).

LIME.—A discussion took place with regard to the value of lime as a fertiliser. Mr. Holzgreffe considered the land around Millicent contained sufficient lime, but apparently the presence of limestone did not obviate the necessity of providing lime in its slacked state. The Chairman remarked that while farmers in the north of this State almost invariably obtained good crops from limestone country, this was not the case in Victoria, where there was flint limestone. Mr. Hart explained that the lime tended to sweeten the land, and its use in newly drained swamps was very beneficial.

MANURING GRASS LANDS.—Applications of manure to grass lands were best given in the month of August. Generally speaking, where this practice was adopted the lands never needed resowing.

MANURE FOR ONIONS.—The Chairman recommended dressing land in which onions were to be planted with stable manure. The effect of wood ashes also was very good.

MAIZE.—Several members spoke highly of the value of this fodder. To grow successful crops it was essential to keep the land free of weeds. It was liable to be affected by frosts, and Mr. Oberlander mentioned that it had not done well with him on swamp lands.

Naracoorte, July 13.

(Average annual rainfall, 22 in.)

PRESENT.—Messrs. L. Wright (chair), W. E. Rogers, E. Coe, A. Caldwell, W. Loller, A. Langeludecke, jun., C. Bray, J. M. Wray, S. H. Shinckel (Hon. Sec.), and one visitor.

BERSEEM, RYE, AND MANGOLDS.—Mr. Loller exhibited specimens of berseem which he had raised from seed presented to the Branch by Mr. A. Robertson (Struan). There was a good deal of mustard in it. He had also raised some plants from seed procured from the Department of Agriculture. One lot was sown on the 16th April, and came up on the 22nd of April; and the other lot was sown on the 12th of April and came up on the 24th. He had sown a quarter of an acre, and it had stood the frost very well. It made better growth in winter than lucerne. He also showed rye, which was about 3ft. long, and had been fed off. It did very well in this district. He had experimented with mangold tops for feeding off with stock, and they showed good growth for winter.

Wirrega, June 29.

PRESENT.—Messrs. Bice, Purdie, C. and F. Meier, R. Langdon, Fairweather, J. Green, L. Pitman, F. and L. Densley, Exton, Cook, and two visitors.

GRASSES.—Mr. Bice read the following paper:—"This subject has been most ably dealt with at several of the Agricultural Bureau Congresses by gentlemen who have made a special study of it. So far as one can judge, the result has been far from satisfactory in so far as the cultivation of grasses is concerned. Before many years have passed, however, we may be able to show the results of a little labor and care, by the nutritious feed in our paddocks. With our soil of a sandy loam, and the splendid rainfall, also the comparatively late season, this district should be the natural home of grasses. Ultimately mixed farming will be the order, and I consider the fattening of lambs will eventually pay far better than wheat-growing. Firstly, I shall deal with one of, or I might say the

best fodder, viz., lucerne. Both as hay and green feed its fattening qualities are of an extremely high standard. That we can grow this excellent fodder with success has been proved very conclusively by several farmers in the district. Having had some little experience in the Murray Valley with the growing of lucerne, I have observed many points in connection therewith and the extensive tests with the numerous varieties grown on the Government Experimental Farm. Some of the varieties cultivated there are South Australian, Hunter River, Turkestan, Provence, American, Arabian, and Peruvian. Naturally we cannot expect anything like the results that they have obtained, nor perhaps will their best varieties be ours. Last year I tried Arabian, but owing to an extremely dry spring and summer, it died out, or apparently so. This variety is a remarkably quick grower, although perhaps not so good without irrigation as the true Hunter River. I should recommend sowing it broadcast at the rate of 10lbs. to 15lbs. to the acre on well-prepared land, harrowed and rolled after seeding. As we are not able to irrigate, my idea is to sow about 1 bush. of barley with the above amount of seed about May. Some prefer September, but by adopting the earlier sowing the lucerne has a chance of becoming well established before the dry weather comes. Lucerne should be cut when one-tenth in bloom. If irrigated, water a few days before cutting. This prevents evaporation, and the plants move right away after cutting. To sow 1lb. to 3lbs. to the acre of either Turkestan, Provence, or Hunter River with the wheat would not only improve our lands—as it is an excellent fertiliser—but would increase the carrying capacity of our stubble paddocks. Turkestan is a cheaper variety, and stands grazing much better than the others. Prairie grass is a perennial and a splendid fodder, which grows during our winter months when the natural grasses are dormant. In Western Queensland, on heavy black soil it grows most luxuriantly. They simply sow it, as all their other grasses, on the ashes, without the slightest cultivation. So far it has only grown to about 9in. or 10in. high with me, but I intend this year to dress a plot with super. Previously it has had blood manure applied at the rate of about 70lbs. to the acre. The South-East has been recommended to sow brome grasses. One of the varieties (Hungarian brome) under experiment on poor sandy land has thrived remarkably well, making a dense succulent turf about 1ft. high, and standing drought well. When once established it appears to be hard to eradicate. Rhodes grass is a very valuable fodder, but I would not recommend growing it on our lighter soils. It should do well on the red loam, and it makes a very heavy growth on good heavy land. Red fescue has been described as a vigorous, tall grower 3ft. to 4ft. high, exceedingly hardy, and yielding a heavy cut of hay. It succeeds best on comparatively wet lands. Cocksfoot has been proved in this district. It makes a rapid growth after early rains, and is one of our most valued grasses. It has been known to grow 23in. in eight weeks, and should do well on lands that are well drained. So far as one can judge of the various grasses tried down here, this must take the place of pride. Its feeding value is of a very high standard. It should be sown as soon as possible after the first rains, at the rate of about 20lbs. to 30lbs. to the acre. Of the rye grasses I prefer Perennial, which is a quick and early grower, and also very nutritious. Small quantities should be sown with other varieties. *Pasp. dilatatum*, or golden crown grass, so far as I can judge, has not been a success here. I consider that when our red land has been cleared and well cultivated it will do far better than on the more sandy soil. No doubt this is quite the best known of our grasses. The name 'drought grass' which it has gained, speaks for its hardiness. It is most nutritious, will stand the rough time the stock give it, and responds quickly after a summer rain. If allowed to seed it spreads very rapidly, and is one we might class as purely a summer grass. Perhaps the reason of the poor germination of the seed is that the grass ripens unevenly. It pays to procure the best seed; the initial expenditure is amply repaid in the germination. *Paspalum* germinates in from seven to 21 days, and needs both heat and moisture, but it can be sown in our early winter without detriment to the seed. It has been known to germinate after being in the soil for two years. Sow broadcast, 6lbs. to 10lbs. per acre. *Panicum crus galli*, or barnyard grass, makes a most prolific growth, especially under irrigation. I have fed this grass to cows with marked success. It is a rapid grower after being fed off. The hay, though on the coarse side, is readily eaten by stock. Owing to the dryness of last spring my plants died off before maturing, but they made rather a good growth the first year. Sow 5lbs. per acre. *Phalaris commutata* is a splendid winter grass. At Brimbago, also at Messrs. Langdon Bros., it has made rather a good stand. The field test has yet to be made; nevertheless, on well cultivated land I feel confident it will prove one of our best winter grasses. It stands the most severe frosts, and is in every respect a most hardy grass, yielding a rich herbage, of which stock are very fond. It stands grazing very well. Veldt grass, a very hardy perennial, grows rapidly after the first rains, but dries off in the latter part of spring. It grows where other grasses fail. It has made

splendid growth in the Pinnaroo district. Stock are very partial to it, both in its dry and green state. Rib grass makes a really good growth during the early summer. It may be seen at its best at the foot of Mount Lofty Ranges. Stock eat it readily." A good discussion followed the reading of the paper.

Wirrega, July 27.

PRESENT.—Messrs. Exton, Bice, M. and J. J. Green, F. and A. Densley, F. and E. Meier, Purdie, L. Pitman, Cook (Hon. Sec.), and one visitor.

THE PRESERVATION AND CARE OF HARNESS.—Mr. M. Green read the following paper : —“As you are all well aware, harness is expensive, and great care should be taken with it from the first time of using. Give due attention to all leather by protecting and housing it in a proper manner. First of all clean it regularly. The best way is to wash with soft-soap and warm water. Unbuckle all straps and clean thoroughly under the buckles, as rust and sweat are the worst enemies of leather. When dried off, apply a dressing made as follows :—1 quart cod liver oil, 1lb. tallow, $\frac{1}{2}$ lb. beeswax, melted together. If for buggy harness, and a good polish is required, add to the foregoing $\frac{1}{2}$ lb. of vegetable black, 1oz. turpentine, and increase the amount of beeswax to $\frac{1}{2}$ lb. Do not at any time hang harness in the stable, as the ammonia fumes rising from the manure badly affects any class of leather. We all hang collars and winkers so that they are handy, but if we keep the harness out of the stables I am certain we shall save pounds in the course of a few years. Keep a ball of wax, hemp, and flax, and a few awls and saddlers' needles handy, as material must wear in time; but if taken in hand immediately much will be saved. I would also advise all of you to use the keepers which are placed on the hames straps. How often are the hames just buckled and the end of the strap left hanging loose. This looks very sloppy and untidy, and the keepers are put there for a purpose.”

LOSS OF A HORSE.—Mr. J. Green gave an account of the illness and treatment of one of his horses, and also of a *post-mortem* examination held on same. The horse showed every symptom of suffering from internal parasites, and was vigorously treated with tartar emetic and other worm cures. The animal was also treated for sand, but without result. The *post-mortem* revealed that parasites were present in enormous numbers, and members were puzzled that the treatment did not shift any of them.



Daisy Queen—1st Three-year-old Shorthorn Cow at the 1910 Show of the Royal Agricultural Society at Liverpool.

AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

Pruning of Fruit Trees, by G. Quinn, 1s. 3d.; posted, 1s. 7d.

Vinegrowers' Manual, by A. Sutherland, 6d.; posted, 7d.

Reports of Conferences of Australasian Fruitgrowers held at Brisbane and Wellington, 1s. each, or 1s. 1d. if posted.

Journal of Department of Agriculture of South Australia, 1s. per annum in advance: 3d. per single copy to residents of South Australia; 2s. 6d. per annum to other places.

Any of the following Bulletins and Leaflets may be obtained by sending a penny stamp for postage:—

Agriculture, Miscellaneous: Agricultural Bureau Congress Reports; Agricultural Experiments; Amount of Spirits to be Extracted from a Ton of Raisins; Depth of Sowing of some Agricultural Seeds; Hints to Intending Irrigationists; Housebuilding in New Districts; Lucerne Cultivation and Management; Lucerne Harvesting; Milling Characteristics of Australian Wheats; Milling Experiments; Milling Qualities of South Australian Wheats; Reclamation of Land; Roseworthy College Farm Flocks; Roseworthy College Harvest Reports; Roseworthy College Permanent Experimental Field; South Australian Wheat Yield, 1907-8; Stage to Cut Wheat; Hay; Trial of Stone-Gathering Machines; Salvation Jane or Paterson's Curse.

Horticulture: Apple Mussel Scale; Bordeaux Mixture; Cidermaking; Curculio Beetle; Codlin Moth; Currant Industry; Defects in Export Apples; Fertilisation of Orchard Lands; Fruit Drying; Fruit Flies; Fruit Preserving; Grape Vine Mildews; Gumming Disease of Peach and Almond Trees; Selection and Planting of Fruit Trees; Irish Potato Blight; Peach Leaf Curl Fungus; Plums and Prunes; Preserving, Canning, and Drying Fruits; Production of Early Tomatoes; Remedies for Diseases of Fruit Trees and Vines; Some Notes on Almonds.

Dairy: Milking of Cows; Spaying of Cows; Taints and Flavors of Dairy Produce.

Stock: Branding of Stock; Stomach and Bowel Diseases of the Horse.

[Every farmer and fruitgrower should join the Agricultural Bureau. Write to Department of Agriculture for particulars.]

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultural Bureau.

The Annual Conference of the Hills Branches of the Agricultural Bureau will be held at Meadows South on Monday, October 21st, commencing at 10-30 a.m. The opening address will be delivered by the Hon. T. Pascoe, M.L.C., Minister of Agriculture. An interesting programme is being arranged, including papers by Messrs. C. Ricks (Cherry Gardens) and H. F. Rollbusch (Woodside Branch). The officers of the department who, it is anticipated, will deliver addresses are Messrs. George Quinn, Chief Horticulturist; P. H. Suter, Dairy Expert; and Veterinary Surgeon F. E. Place, M.R.C.V.S., B.V.Sc. There will be ample opportunity for questions and discussion. The Meadows Branch has the management in hand, and the usual arrangements have been made for refreshments to be supplied by a caterer.

Lands for Settlement.

Referring to the opening up of new land, the Premier in his Budget speech stated:—"Surveys are in progress in the vicinity of Weedina and Minnipa Hill, where four survey parties are engaged; in the hundred of McLachlan, about 40 miles east of Elliston; in the Darke's Peak country; north-west of Franklin Harbor; on the Tailem Bend and Brown's Well railway line; and the commonage lands in the South-East. The area now under survey is about 735,000 acres, on which 15 surveyors are engaged. A considerable portion of this land should be available for offer during the present financial year. The area of land open to application on June 30th last was about 220,000 acres, in various parts of the State. It is anticipated that three new hundreds along the Tailem Bend and Brown's Well line will be gazetted open to application during the next few weeks."

Land Allotted.

In the course of his Budget speech the Premier (Hon. A. H. Peake, M.P.) said:—"The total area surveyed during the year amounted to about 647,700 acres; 531,588 acres of Crown lands were allotted to 462 applicants (average to each 1,151 acres); 1,247 acres of homestead blocks were allotted to 77 applicants (average to each 16 acres); and 75,573 acres of repurchased lands were allotted to 357 persons (average to each 212 acres). The last mentioned area includes the Moorak Estate No. 2, part of which was subdivided into small blocks, some comprising only half an acre, for residential or business purposes. The total number of allottees for the whole area disposed of (608,408 acres) was 896."

Quality in English Wheat.

At a conference of agricultural teachers which met at Cambridge on July 18th, Professor R. H. Biffen read a paper on "Quality in Wheat," in which he stated that the appearance in the British market of the Canadian wheat, "Manitoba Hard," and the improvements in milling processes have set up a new standard of quality for baking purposes. Rating the best Canadian wheat at 100, a good average flour wheat now in general demand for bread-making might be reckoned at 80; while to ordinary home-grown wheat, the highest figure that could be assigned was 60. As a consequence the British miller was forced to use a large admixture of foreign wheat, otherwise his flour was unsaleable. Professor Biffen stated that "strong" foreign wheat may be worth to the inland miller as much as 10s. per quarter more than the home grown. The Home Grown Wheat Committee have conducted a long series of experiments with the object of discovering what steps should be taken to produce strong wheat in England. It has been shown that neither soils or manure are capable of raising the baking quality of ordinary British wheat above 70, and that improvement must be sought in the introduction of new varieties. Wheats from all parts of the world have been tested, with the result that only one wheat (of the varieties in general use), namely, Red Fife, has been found to retain its strength under all conditions of soil and treatment. Unfortunately, in most parts of the country this variety is such a poor cropper that it is quite unsuitable for introduction.—*Journal of Board of Agriculture.*

Alfalfa.

About the most gratifying sight to the Californian eye these days (says the *Pacific Rural Press*) is the alfalfa crop. There is no green so richly beautiful as that of an alfalfa field; there is no harvest so absolutely satisfying as the long rows of new-cut alfalfa hay. That crop means beef and pork, milk, butter, and cheese, the absolute staples of life. It means a soil not exhausted but enriched by the growing of the crop; it means so much addition to the world's nutriment, caught freely out of the inexhaustible air. It means the one crop which cannot be overproduced, the staple of more varied uses than any other known product. If the water lasts, good alfalfa land now will be good alfalfa land still a million years from now, without ever drawing on anything but the air for fertiliser. If in time beef becomes too scarce and dear for the common food of the people, there will still be cheese—a food quite as nutritious and, when properly prepared, quite as palatable and digestible. And the alfalfa fields can furnish us plenty of cheese and butter, and some beef, forever. Alfalfa utilises the soil 12 months in the year, and produces as many crops as water and sunshine will allow. It is both beautiful and practical, profitable and inspiring. And all we can get out of it will be only just enough.

The Pending Wool Shortage.

That the world is not producing enough wool to satisfy a constantly increasing demand is obvious, says the *Chicago Breeders' Gazette*. Present prices are not only legitimate, but further appreciation will merely verify trade forecasts. As there are annually more mouths to eat meat, so there are more backs to cover, and the wool-producing regions have been reducing rather than expanding flocks. The celerity with which the 1912 wool clip has passed out of growers' hands reveals manufacturers' needs. What the shortage in the domestic clip actually is can be only estimated, but buyers place it all the way from twenty to thirty million pounds. In many sections they have not found 50 per cent. of the amount they have been able to purchase in recent years. The statistical position of the wool market is decidedly strong.

Dried Strawberries.

J. C. F. Holcomb, a berry grower of White Salmon, Washington, has discovered, after many experiments, a sun-drying process for strawberries which has proven so successful that he now receives orders for the product from many States in the Union, and also from Alaska. It is said that he intends later to organise a company and turn out the fruit on a large scale.—*Californian Fruit Grower*.

Australian Sheep in South Africa.

According to South African Customs figures, the value of sheep received by that country from Australia since the year 1906, inclusive, is no less than £123,146, and represents in round figures 29,300 animals. As could only be expected, rams have largely preponderated in these imports, and, says *The Wool Record*, it needs scarcely a moment's reflection to see what an immense influence this new blood must be having upon South African sheep and wool.

More Brain—Less Sweat.

Abraham Lincoln said 60 years ago that a man was foolish to walk all over 40 acres when he could raise the same crop in 10 by intensive cultivation. It is not so necessary that the farmer should plant more acres or work harder, but it is only common sense for him to use modern scientific methods instead of his grandfather's old "rule of thumb" and his grandmother's old rule of the "dark of the moon." The modern idea is to save work and get larger results; to better the quality and to make more money. If every farmer should grade and select his seed; should grade and clean the grain he markets, and should feed the screenings on the farm, the price of every grain would go up and stay up.—*Campbell's Scientific Farmer*.

Agricultural Ireland.

Oats, not potatoes, occupy the largest acreage in Ireland. About 1,000,000 tons, chiefly black oats, are produced annually. The Irish potato crop generally exceeds 3,000,000 tons. Irish potatoes hold the first place on the British market. Ireland also supplies the British market with most of its cattle, over 800,000 head being exported to Great Britain in 1909. Half of the Irish exports are young animals, which are fattened in England and Scotland; in fact, the chief Irish export is cattle. After livestock, butter is the chief export. The butter trade is valued at about 20,000,000 dollars per year.

Beet-tops for Cows.

There are dairymen in California who maintain that sugar-beet tops make one of the best feeds available for the production of firm butter. These tops consist of the leaves and the crown of the beetroot, says *Hoard's Dairyman*. Analyses of these tops prove that water constitutes about seven-eighths of the aggregate substance. One hundred pounds of fresh tops are found to contain 8.25lbs. of digestible nutrients composed as follows :—Protein, 1.71lbs.; carbohydrates, 6.49lbs.; fat, .05lbs. Beet tops alone will not make a balanced ration, or anything near to it. They can only be used as a portion of an animal's forage ration.

The Needs of Lucerne.

Regarding the needs of lucerne, the *Agricultural Gazette* says, we could almost sum the matter up in four words—lime, drainage, humus, and inoculation. Perhaps we have given these in the order of their relative importance. Lime is necessary on soils not naturally of limestone formation or filled with limestone pebbles. The importance of this is impressed on us more and more each year; in fact, we believe to-day that there have been more failures throughout the United States on account of insufficient lime in the soil than from any other cause. Then as to drainage, there is no use in planting lucerne on any soil where water may ordinarily be found at a depth of less than 3ft. The lucerne may grow all right until its roots strike this water, but then it will die. Fertile soils contain enough humus. Impoverished soils may be so deficient that special preparation must be made before lucerne can possibly succeed. Where stable manure is not available on impoverished soil we would recommend preparation for lucerne one or two years in advance, growing such crops as crimson clover, mammoth clover, cow peas, field peas, or soya beans, and preferably turning them under or else pasturing them off, so as to give the soil the greatest benefit possible from them.

Local Improvement Clubs.

Co-operation (says the *American Agriculturist*) has been the keynote of most of the rural advancement that has been so marked in the last decade. The people are learning how to get together in an effective way for the promotion of a definite object. Automobile clubs in small towns have been effective for securing better road and bridge conditions merely by intelligent co-operation with the farmers and landowners of the surrounding community. The numerous farmers who own automobiles have quite naturally joined with these village associations; result, more practical road work is being done every year from local initiative. The development of neighborhood social centres and neighborhood clubs both among farm men and farm women have in many notable instances secured important and permanent improvements for the whole community. The centralised country high school is frequently becoming a neighborhood centre for meetings of all kinds, and from these local civic centres movements have been inaugurated and directed which have had township-wide and county-wide influence for betterment. Generally, the less formal and binding the form of the organization the more satisfactory are its workings. The mere fact of getting together for an exchange of ideas and for mutual enjoyment and betterment is a vital factor. The neighborhood club under whatever name it may exist is fulfilling a long-felt need in neighborhood affairs and will prove a desirable influence in any rural community.

Protein in Alfalfa Hay.

That alfalfa hay contains more pounds of protein for each 100lbs. than any other kind of cured hay, and also contains a large amount of carbohydrates, are interesting facts brought out by a new bulletin of the College of Agriculture of the University of Wisconsin. Alfalfa contains 11lbs. of protein for each 100lbs. of hay; while alsike clover contains 8lbs.; red clover 7lbs.; and barley hay 5lbs. Other hays, such as redtop, Kentucky bluegrass, Timothy, and oat hay, contain less than 5lbs.

Boys' and Girls' Clubs in Iowa.

The United States Government is to co-operate with the Agricultural Extension Department of Iowa State College in making the boys' and girls' club work in Iowa the greatest of its kind. Prof. W. J. Kennedy, head of the Extension Department, has just closed an arrangement with the Department of Agriculture at Washington whereby the college will receive 1,000 dollars annually for the salary of an additional worker among Iowa boys and girls, 300 dollars annually for travelling expenses, and the franking privilege for all official bulletins and circulars sent to the boys and girls as

part of their study work. This year something like 15,000 boys and girls are enrolled in the study clubs. They are growing corn, cultivating gardens, raising poultry and pigs, cooking, sewing, and doing housekeeping. All their work is done under supervision and it will close with the annual contests at the short course at the college in January. With the help now provided Superintendent Bishop, in charge of the work, hopes to organise 10,000 more boys and girls in another year.—*The Breeders' Gazette*.

Flaxseed.

As a grower of flaxseed, Argentina holds first rank among the five countries—Argentina, Russia, British India, United States, and Canada—which produced the commercial crop of the world. Sown in May and June, the plants occupy the soil during the Argentine winter and are for the most part cut in November and December, the close of the transequatorial spring and beginning of summer. Flaxseed has virtually no use other than for the manufacture of linseed oil and oil-cake. The Argentine seed-crushing industry is insufficient for domestic needs and an average of upward of 100,000galls. are imported annually from the United Kingdom and France. The exports of flaxseed from Argentina in late years have been heavier than those from any other country. About 3,209,000bush. of Argentine seed were taken by the United States alone in the year ended June 30th, 1910, and of the 6,291,000bush. imported in 1910-11 a heavy proportion came from the South American producer.

Handling Young Pigs.

When the suckling pig gets about three weeks old, says a writer for the *Texas Farmer*, he will usually begin to notice his mother's feed. Then is a good time to make a little separate pen for him with a creep hole to it, so the pig can get in and eat without being disturbed by its mother. Skimmed milk mixed with wheat shorts and a little fine ground corn is about the best thing to start the little pigs eating on. Soaked corn will also be usually eaten readily, but there is nothing that is quite as satisfactory at this time to get the pig started on as milk. Be sure the little fellows are eating well and are not depending much on the dam for milk before weaning. If they are just nibbling around the trough and are depending mostly on their dam for a living they will receive quite a set-back, and maybe the smallest ones will die when the sow is taken away from them. Right at weaning time is a very critical period in the pig's life, therefore a little extra care at this time will pay royally. If handled well they will never lose their baby fat and will make the best gains for food consumed of any part of their lives, but if they are stunted it will take lots of time and patience to get them to growing again, and it is very easy to stunt them.

Imports and Exports of Plants.

During the month of August, 9,232bush. of fresh fruits, 3,602 bags potatoes, 427 bags of onions, and 150pkgs. of plants were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 88bush. of bananas (chiefly over-ripe) were rejected. Under the Federal Commerce Act, 1,096 cases of fresh fruit, 2,660pkgs. dried fruit, 62pkgs. preserved fruit, 8pkgs. plants and seeds, and 100pkgs. honey were exported to oversea markets during the same period. These were distributed as follows:—For London, 128 cases oranges and 2,401pkgs. dried fruit; for South Africa, 225pkgs. dried fruit; for Germany, 100pkgs. honey; for India and East, 670 cases apples, 62pkgs. preserved fruit, 15pkgs. dried fruit, and 1pkg. trees; for New Zealand, 298 cases citrus fruits, 19pkgs. dried fruit, and 7pkgs. plants and seeds. Under the Federal Quarantine Act, 633pkgs. plants, seeds, &c., were admitted after examination from oversea sources. During the month of September, 12,007bush. of fresh fruits, 747 bags of potatoes, 283 bags of onions, 32pkgs. vegetables, and 24pkgs. plants were inspected and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 368bush. of bananas (chiefly over-ripe) were rejected. Under the Federal Commerce Act, 861 cases of fresh fruit, 103pkgs. of preserved fruit, and 2,441pkgs. of dried fruit, and 1pkg. plants were exported to oversea markets during the same period; These were distributed as follows:—For London, 41 cases of oranges and 2,239pkgs. dried fruit; for South Africa, 197pkgs. dried fruit; for New Zealand, 538 cases citrus fruit, 201pkgs. dried fruit, and 1pkg. plants; for India and East, 280 cases apples, 2 cases oranges, 103pkgs. of preserved fruit, and 1pkg. dried fruit. Under the Federal Quarantine Act, 544pkgs. plants, seeds, bulbs, &c., were introduced from oversea markets.



ALLENDALE HOMESTEAD, OODNADATTA.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

STOCK INQUIRIES.

(Replies supplied by Mr. F. E. PLACE, M.R.C.V.S., B.V.Sc., Veterinary Lecturer).

Is Meningitis in Cattle Contagious?

A member of the Minlaton Branch of the Agricultural Bureau stated that some time ago he had a cow which showed symptoms of meningitis. He asks if there is a danger of the rest of the herd becoming affected.

Reply—Some forms of meningitis in cattle are contagious, but with the exception of the tubercular form those found in South Australia are as a rule not so. Should other animals show symptoms, bonemeal and salt, either as a lick or in 2oz. doses daily, would very likely act as a preventive.

Removal of Callous Growth.

"E. J. M.," Angas Plains, asks—(1) I have a young horse with a callous lump under the jaw, resulting from strangles 12 months ago; should it be cut out? (2) Would a filly with hip down do for breeding purposes?

Reply—(1) Cutting out is probably not necessary. Try rubbing in daily for 10 days oleate of mercury 10 per cent., and give $\frac{1}{2}$ dram iodide of potassium in a little drinking water once a day for 10 days. (2) Hip down, if accidental, is not likely to be transmitted to offspring.

Strangles.

A member of the Belalie Branch has a one-year-old horse that, following on strangles, has a suppurated swelling under the jaw; the animal is gradually wasting. He asks for advice as to treatment. Another member has a two-year-old colt which has been wasting for about eight months. There is no running from the nostrils, and the eyes are bright, but its head is a little swollen.

Reply—(1) The continued form of strangles described is fairly common ; abscesses form in different parts of the body, and the disease lasts for many months. Two grains of iodide of arsenic in 20 grains of sugar of milk twice a day on the tongue for some days would probably improve matters. (2) The symptoms of the two-year-old colt point to bloodworms. Half an ounce of Fowler's solution of arsenic twice a day in a little bran, continued for a week, stopped for a week, and repeated for a second week, will probably cause an improvement.

Supposed Blood Poisoning.

" H. H. O.," Glencoe, had a foal which prior to being weaned was in the pink of condition. On being taken from his mother he was placed in a paddock—low, flat country, but thought to be healthy—and every second day at first given a feed of good oaten chaff, and then twice a week. One side of his head became swollen, and afterwards the swelling extended all over the head. He was unable to eat, but drank freely. The animal did not appear in much pain, and was given a little saltpetre, but the swelling spread all over the body, and just before death, seven days after the swelling was first noticed, the eyes protruded very much.

Reply—From the symptoms described the foal probably died from a form of blood poisoning called *purpura hæmorrhagica*. Saltpetre is not a very good thing for this complaint. Sulphate of quinine in 15 grain doses three times a day on the tongue is better.

LATE HATCHING, &c.

" White Leghorn " asks—(1) What are the general causes of late hatches ? (2) In scratching sheds what space per fowl should be allowed ? (3) Is the dry mash method of feeding advisable ?

Reply—(1) Several breeders have reported that the eggs placed in incubators this season are hatching, as a rule, a day late. This refers to various makes of incubators, including those you mention. No trouble in this respect is experienced at the three Government Poultry Stations, where the breeding stock are housed under varying conditions, including confinement in scratching sheds. This trouble has often been experienced by breeders in other seasons, and is probably due to abnormal seasons affecting the stock. In many cases the stock itself is to blame, and in other cases the methods adopted (feeding, etc.). (2) In large American scratching sheds the floor space per fowl works out at 3·4ft. Should recommend 4ft. to 5ft. here. In such cases, however, there should be a cement concrete floor, overlaid with 6in. of sandy loam, and then the scratching material (short straw) on top. (3) *Re Dry Mash*.—In this form of feeding the stock must be reared on dry mash and grain, &c., fed in suitable hoppers. Americans claim that the smaller number of eggs laid is more than counterbalanced by saving in labor. The whole question, however, requires careful experiment under our conditions, because there are

questions other than those relating to mere numbers of eggs to be considered. Theoretically the system is sound as regards the mechanical act of feeding. The dry feeding method has many friends in Victoria, and the results financially, and appearance of the stock, seem to justify its adoption.

MANURING ORANGE TREES.

“W.D.” asks—“Is it beneficial to put superphosphate around orange trees?”

Reply—“Superphosphate may be applied to orange trees with safety, and usually to advantage, using from 1lb. to 6lbs. per tree, according to size of same. The fertiliser may be sown thinly around the tree, taking in an area extending from near to the stem to a distance of several feet outside the spread of the branches. This should be done in the winter just before digging the soil. It is not too late to apply it now where irrigation is practised through the summer.”

GREEN FEED FOR COW.

A Wallaroo correspondent seeks information respecting the growing of green feed for a cow, &c.

Reply—Mr. G. Quinn, Horticultural Instructor, writes in reply—“I beg to advise you try lucerne instead of mangels, as you will obtain on the average a quicker and larger and more nutritious fodder therefrom. If you have an area 50ft. or 70ft. square, prepare the land at once and sow the seed straight away. The soil needs to be worked up, manured, and then tilled down to a fine loose condition—like a well-worked fallow field. Sow about 2lbs. to 3lbs. of seed on the area mentioned above and use from 20lbs. to 28lbs. of superphosphate when preparing the ground. Sow the super. over the ploughed or dug ground, and then mix it into the soil when harrowing. After sowing the seed cover it over very lightly by dragging a light harrow or tree-bough or rake over the surface. If you have any loose horse manure spread it thinly over the surface to keep the soil from crusting. If the soil be moist the seed will germinate without water; if it be dry apply water through a sprinkler or hose. The sprinkler is best, as it showers the drops gently and does not crust the soil like a thicker body of water. Always cut the lucerne systematically and feed to the animals; do not let them graze upon it. Always apply a watering to the ground, either just before or just after cutting a patch. Never let lucerne seed form, but cut it at the flowering stage, and if you do not want it at once, dry it for hay, of which it makes the very best. *Re* peas. It is too late to sow garden peas now, but you could sow Canadian Wonder dwarf beans, cucumbers, melons, marrows, &c., and sow or plant out tomatoes in your vegetable garden.”

GRAPE VINE PRUNING FOR AMATEURS AND BEGINNERS.

By GEO. QUINN, Horticultural Instructor.

(Continued from page 139, September issue.)

SPRING AND SUMMER PRUNING.

Under this heading is classified all of those operations performed upon the vine after the period of vegetative activity begins. Taken in general there is a great diversity of opinions expressed upon the necessity or even the utility of the practice by those engaged in the cultivation of grape vines. The practical men usually contend that it is necessary from economical reasons, putting forward that it is desirable to restrict the spread of the plants, or that it is needed to increase the setting or the size and color of the fruits. On the other hand, the more scientifically informed argue that not only is it not necessary and avoidable but distinctly injurious, if pursued for a lengthy period on the lines frequently adopted by vigneronns. As the object of these notes is to assist in guiding the beginner along safe lines from the inception of his vine-growing, the writer unhesitatingly supports the side taken by the scientific men.

The part played in the economy of a plant by its green chlorophyll bearing portions should ever be kept in mind in all of the practices followed in vine cultivation. This consideration should even begin with the setting out of the plants, inasmuch as the judgment displayed in deciding the distances apart to place them will aid materially in rendering unnecessary much of the rough restriction of the growing canes now practised.

The leaves are, in function, the lungs and stomach of the plant, and in so far as its powers of respiration and assimilation are reduced by their removal so is the vine checked and weakened. In the leaves is manufactured the starch, which is afterwards changed into sugar, a large portion of which finds its way into the fruits. Hence, the removal of healthy leaves retards the production of this very essential constituent.

Spring and summer pruning as practised here has been said to consist of three operations, viz.—(a) Disbudding, (b) pinching, (c) topping.

The first-named is defined as the removal in the very early stages of their development of all watershoots and other superfluous growths from amongst those found upon the fruiting canes. This is done with a view to concentrating the energies of the plant into those shoots deemed to possess the greatest present and potential value. It is applied also in connection with the training of vines under certain systems, such as in the manner described in these notes, in shaping the various spaliers and cordons.

The second operation, called "pinching," has been utilised in the direction of removing the sappy terminal points of the flowering canes to induce the setting of the fruits through the temporary check which such an action imposes at that period upon the vigor of the shoot, as well as in stopping the leader in the formation of the main arms of the Thomery spalier.

The third operation, which has been referred to as "topping," consists of an indiscriminate lopping off of the upper portions of the growing shoots to a length of several inches and not infrequently to that of a foot or more. This procedure has been followed largely to enable the implements of tillage to pass without hindrance between the rows of vines. The practice has been widely denounced by those whose opinions are entitled to respect. Quite apart from its weakening influences upon the vines, anyone who, in the winter following upon its application, proceeds to prune the vines is met with a tangle of laterals of a particularly annoying character. Should the variety need rod-pruning the results of such a topping are disastrous to his chances of securing good fruiting canes.

In respect to these operations the beginner is advised to proceed with caution upon the following lines :—

DISBUDDING.

In the production of some sorts of table grapes and Muscat raisins it has been found necessary, in order to secure fruit of the highest quality, to prune the vines in winter to a limited number of spurs, each possessing one or two buds only. The effect frequently observed to follow upon this procedure is the starting into activity of a fairly large proportion of watershoots on the old wood, as well as buds in the angles made where the spurs join the older limbs. In manipulating the watershoots, all of those arising from the main stem, whether they emerge above or below the soil line, should be rubbed away while yet in the brittle stage. Those starting from any of the main or secondary arms should be considered in the light of their possible value in renewing the arm, as explained in the earlier chapters on winter pruning. Should there be indications of the necessity for their early use, such as are well situated should be saved until the next winter season determines this point. The shoots arising out of the angles where the spurs join the older wood or secondary arms are not truly watershoots, and their closer junction

with the old wood may render some of them of value to work upon at the next winter's pruning.

PINCHING.

This operation does appear to secure a certain amount of increase in the setting of the berries on the bunches formed upon some grape vines, and the check administered to the shoots is so mild and temporary in character as to render its devitalising influences a negligible factor.

TOPPING.

Where the vines are pruned with good judgment in the winter, and disbudding has been reasonably applied, there should be no need for topping, even when the plants are growing strongly in rich soil. Shoots which threaten to spread across the spaces between the rows should be bent or tied to the trellis wires. In the case of bush vines only the extreme tips need cutting, if any shortening be found necessary to permit unrestricted use of the tillage implements after midsummer.

CINCTURING OR RINGBARKING.

This important method of restricting the activities of some varieties of grape vines, to induce a more consistent setting of the berries upon the bunches, is a form of spring pruning. The cincture, which consists of completely removing an extremely narrow ring of bark from around the stems, main arms, or even canes of the vines, is performed when the corollas are falling (see (2) and (3) Fig. 43) from the blossoms. The immediate effect of this



Fig. 42.—Vine Stem showing Cincture.

is to impede to a large degree—for a short period only—the return of the elaborated sap from the foliage to the root system and thus prevent or check the rapid extension of the roots, which naturally takes place during the first few weeks of returned animation in the spring. This retention of the elaborated sap causes the stem immediately above the cincture to become increased

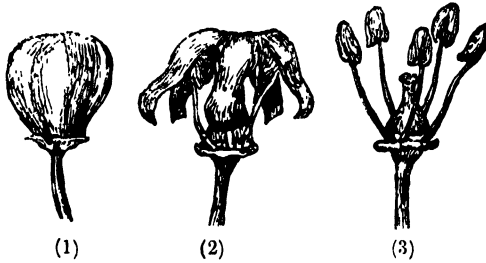


Fig. 43.—Stage of Flowering when Cincture is applied is indicated in (2) and (3).

in diameter, and apparently the meagre circulation of sap allows the berries to make good their connection with the pedicels and become an integral part of the bunch. It is desirable that this checking of the sap should not be of too prolonged a character. Experimental tests indicate that it is essential the disconnected tissues should again bridge over the wound, and thus enable

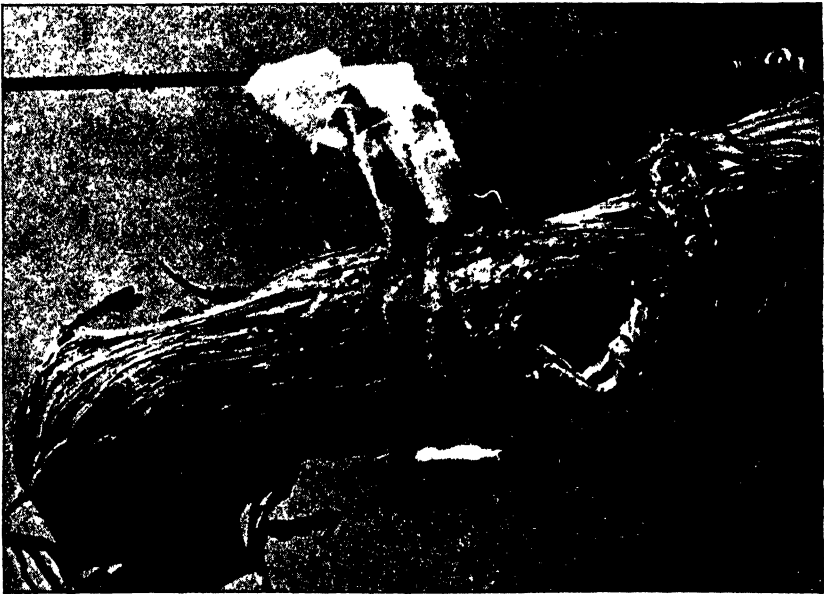


Fig. 44.—Cinctured Stem showing Waxed Bandage and Cincture callused over in Six Weeks.

the circulation to resume its customary course at an early date. If a complete ring of bark, not more than one-sixteenth to one-twelfth of an inch wide be removed (as shown in Fig. 42), the chances of this taking place quickly are increased.

Some currant-growers claim to have obtained equally good results from the use of a simple incision made by passing a sharp knife around the limb, but the general opinion favors the removal of the narrow ring of bark. To secure the rapid bridging of the wounded tissues it is desirable to protect



(a) (b)
Fig. 45.— Comparison of Fruit Setting on (a) Cinctured and (b) Uncinctured Vines.

the cut section against the drying effects of sun and wind. Some growers do this by means of strips of bagging or rag bound around the cinctures. Better results, however, may be secured by the use of strips of calico about an inch wide which have been steeped in grafting wax, as indicated in Fig. 44.

In the tests from which these figures were made the waxed bands enabled the healing callus to completely fill the wound within six weeks, and the nourishing of the fruit and foliage proceeded in a normal fashion. Glancing at Fig. 44, just above the cincture which has been covered by a waxed band,

may be seen the cincture of the previous season, which had not been covered, and it has become dry, and only partially healed.

Currant vines cinctured too severely indicate the devitalising effect of the operation in failing to ripen the terminal portions of the canes, sometimes for a couple of feet in length. In Fig. 45 the comparative effects of the



Fig. 46.—Types of Vine-pruning Shears.

cincture in causing the setting of the berries on bunches of the Zante currant is shown. Although primarily applied to the Zante currant, the cincture has been applied to Sultana and Gordo Blanco vines with promising results in the setting of the fruits. In the case of the former, however, it has been

chiefly applied to the fruiting canes, as opposed to being made upon the main stems or main arms of the Zante currant.

VINE-PRUNING SHEARS.

Fig. 46 depicts two types of shears used in vine pruning. Both of these have wooden handles, to enable the pruner to retain a firm grip when severing strong shoots. Another form of the lower pair of vine shears which is used in this State, but not illustrated here, is not provided with these wooden grips, but has simply the rounded steel handles, the end of one being drawn out a little longer into a flat steel chisel-like point, which is sharpened. This chisel is designed for stabbing off watershoots or suckers. In cold weather when the hands of the pruner are chilled, he experiences some difficulty in retaining a good hold of these steel handles, and it is a common practice to sleeve a short piece of $\frac{1}{2}$ in. rubber hose over each of the steel handles to make a non-slipping grip.



ANALYSES OF FERTILISERS.

The following are further results of analyses made by the Government Analyst (Mr. W. A. Hargreaves, M.A.) of samples of fertilisers taken since the beginning of the year:—

Name.	Potash in readily soluble form.		Nitrogen.	
	Result of Analysis.	Vendors' Guarantee.	Result of Analysis.	Vendors' Guarantee.
	Per cent.	Per cent.	Per cent.	Per cent.
Bell, James, & Co.—“Nitrate of Lime” (ex s.s. <i>Albany</i>)	—	—	12·80	12·75
Mt. Lyell Mining & Railway Co., Ltd.— “Sulphate of Potash” (ex s.s. <i>Annaberg</i>)	52·36	52·00	—	—
Hackett, E. & W.—“Sulphate of Potash” (ex s.s. <i>Osnabruck</i>)	52·03	51·00	—	—

GEO. QUINN, Inspector of Fertilisers.

FARM LABOR.

ACTION BY IMMIGRATION DEPARTMENT.

Owing to applications from farmers for farm laborers required by them for the coming harvest not having been received in time for arrangements to be made for the selection of and passages for men from the United Kingdom, the Government have appointed Mr. J. B. Tothill, a South Australian farmer, at present in India, to select from the ranks of time-expired soldiers in that country, men suitable for farm labor in South Australia. It is proposed that the men, who will be about 30 years of age, should be drawn from the cavalry and artillery regiments and from regiments recruited in the country districts of the United Kingdom, and it is expected that they will soon adapt themselves to farm work in this State. The fact that they are trained in discipline should compensate for their lack of experience in our conditions of farming. Mr. Tothill states in his reports that a number of excellent men are available. It is expected that the first batch will arrive here about the end of October, and farmers desirous of obtaining men should at once apply to the Immigration Department, as only a limited number will be encouraged to come to the State. A number of applications have already been received. Farmers who prefer to have agricultural laborers from the United Kingdom can be supplied with unassisted or nominated immigrants, of whom a number will arrive during the next month. Forms of application may be obtained from the Secretaries of local Agricultural Bureaus.

All that the farmer requiring a man is now asked to do is to advise the department of his requirements, stating the conditions of employment, and guaranteeing to pay the cost of transport of the laborer from Adelaide to his destination. The employé will be given to understand that he is to sign the usual agreement for such cost to be deducted from his wages, with the provision that the amount so deducted is to be paid to him in full if he remains for six months in the farmer's employ. The application form contains no guarantee of employment for a particular period, but the farmer is asked to say whether he can offer permanent employment to a suitable man. It is important for the new arrivals to obtain more than casual labor, and it is desirable that they should settle down in permanent employment until they are in a position to start on their own account.

IMMIGRATION OF LADS FROM THE UNITED KINGDOM.

Reference was made in the Governor's speech at the opening of Parliament to a proposed scheme for the introduction of lads from the United Kingdom. Briefly stated, the proposal is to introduce lads of from 15 to 19 years of age and place them with farmers, who will provide, in addition to food and clothing, a weekly wage and undertake to give the lads a training in farm work, so as to fit them to become settlers. It is believed that this scheme is superior in many respects to adult immigration. The lads would have nothing to unlearn, and would arrive at an age when they would be able to adapt themselves to South Australian conditions, and in course of time would constitute a body of young men from whom we would be able to draw many of our best settlers.

In the first place, the Government desire to ascertain whether there is a demand for lads on the farms, and, if there is, it is proposed, subject to further information being obtained, to proceed with the scheme. A number of those selected would be town lads who are engaged at present as telegraph messengers, porters, errand boys, shop and office cleaners, packers in factories, etc., and, with few exceptions, would not know anything of farm work; but care would be taken that only those physically strong, robust in health, willing, hardworking, and of good character were chosen. Not only would they be medically examined, but also as to their fitness for the work they were about to undertake. Preference would be given to lads in scouts or other brigades.

The Hon. the Commissioner of Crown Lands took advantage of Sir Robert Baden-Powell's recent visit to Adelaide to discuss with him the question of bringing lads trained at the Scouts' farm schools in England to South Australia under the proposed scheme. Sir Robert stated that these lads would be particularly suitable for farmers here, and would be very useful to farmers' wives, as they are trained to make themselves useful in housework. They are also taught discipline and self-reliance.

The boys, on arrival, would be treated as wards of the Immigration Department, and the Immigration Officer would be empowered to enter into agreements with the farmers on their behalf. Forms of application are being distributed, and the farmers will be asked to state thereon the conditions under which the lads will be employed. They would be expected to pay them a minimum wage, to be decided after full inquiry. The rates suggested were as follows, in addition to board, lodging, and clothing:—From 5s. to 7s. 6d. a week on engagement; from 7s. 6d. to 10s. a week after three months; from 10s. to 15s. a week for the second year, and the current rate of wages for the third year. It is suggested that the boys should be paid double rates during harvesting period.

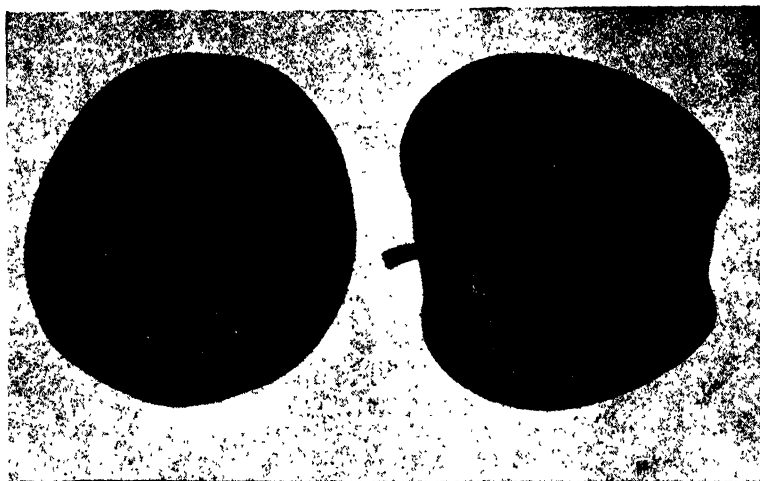
An apprenticeship would be arranged for three years, so as to ensure the farmer the benefit of the training he had given the boy, and he would not

feel that, by taking extra trouble in teaching him, he would be likely to lose his services in the immediate future. It is further suggested that the agreement should provide that the sum of 1s. per week should be paid to the employé for pocket money and the balance paid by the farmer monthly to the Immigration Department upon trust, to be retained, firstly, in payment of the amount advanced by the department at the assisted rate for the employé's passage to and expenses incurred on arrival in South Australia ; and secondly, in trust to be paid to the employé on his attaining the age of 21 years, or sooner, at the discretion of the department. This scheme of compulsory saving is considered to be an excellent one, as it will not only train the boys in thrift but at the end of the apprenticeship each boy would have from £70 to £100 to his credit, which would put him on the road to become a share farmer, and he would, in many cases, be able to help his previous employer to develop his farm. It would be satisfactory to the farmer to have somebody he knows something of and who would farm according to the farmer's own methods.

On the form of application the farmer will be asked to state the accommodation that will be provided, and, as explained in the footnote, he will be asked to say whether the lad will live with the family, take his meals in the house, and sleep in a separate building, or live entirely with the men. It will be important for the department to have this information, as it will be a guide in placing the lads, enabling the youngest to be sent to situations where they would be allowed to live with the families. In this connection it might be mentioned that the farmers will be expected to, as far as possible, make the conditions homelike for the boys.

It is proposed that the apprenticeship agreement should contain a provision for a boy to be removed at a request of the employer should he be guilty of such misconduct as would lawfully justify a master in dismissing a servant. The Immigration Department would also be authorised to terminate the agreement without redress should the employer not abide by any of its terms or not treat the employé properly.

Farmers desirous of obtaining forms of application or further information with regard to the scheme should at once communicate with the Immigration Department. The first batch of lads cannot arrive before March or April next, but it is necessary for the department to know at an early date the number likely to be required, so that definite arrangements for their selection and passages may be made.



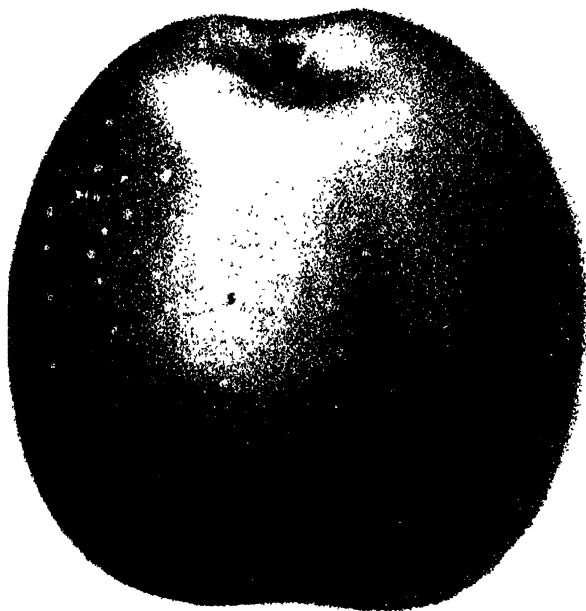
APPLE—CLEOPATRA.

FRUIT.

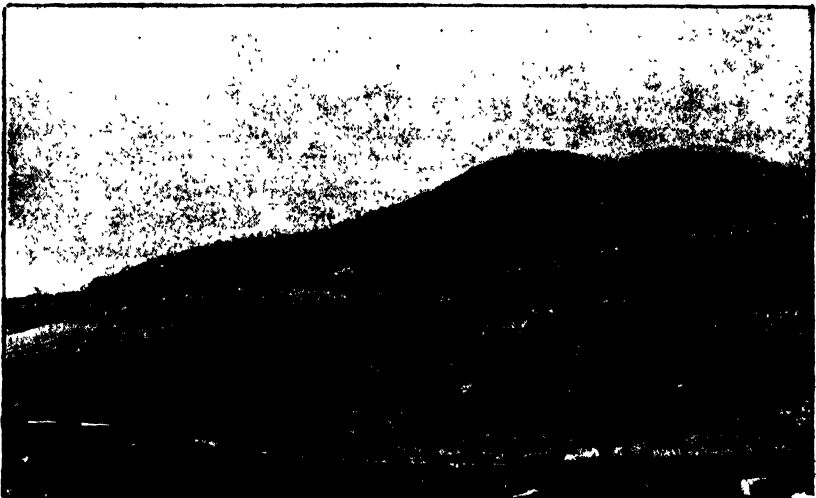
Size—Medium to large, fair samples averaging 3in. long by 2½ in. wide. *Shape*—Oblong to round, in cool damp districts tending to become more or less ribbed or flattened oblong. In hotter and drier situations the fruit may become rounded or widest in transverse section. *Color of skin*—Pale-green strewn all over with lighter spots surrounding in each instance pale-brown specks. Occasionally a faint reddish-brown blush is noticed on the exposed side. When ripened in store the skin changes to a clear pale golden color and becomes covered with a sticky exudation. *Eye*—Closed with short connivent erect segments set in a moderately shallow basin which is flattened or ribbed down the side. *Stamens*—Marginal in position on the tube, which is long, narrow funnel-shaped, leading so dangerously near to the carpellary cavities that the dividing tissues often burst and admit germs of mould into the fruit. *Stalk*—About three-quarters of an inch long, stout and clubbed at the extremity. It is inserted in a slightly compressed or ribbed basin of a pale yellowish-green color, the walls of which are sometimes faintly streaked with a lighter tone. *Flesh*—Pale creamy yellow, possessing a crisp tender texture, and mild, almost sweet juice, but not aromatic or vinous. *Seed cells*—Elliptical, abaxile.

TREE.

Habit—The young tree is an erect and vigorous grower, but owing to a tendency to bear its crops in bunches on the ends of laterals, by maturity it has assumed a globular head. The laterals are stout, smooth, and the bark of a reddish-brown color sprinkled with a few raised light dots. On the older limbs the bark becomes dull and dark-brown. The buds along these laterals



are virile, and if cut back those near the base grow freely. If left unpruned the terminal buds fruit first, and becoming depressed by the weight of the fruit those nearer the base break into growth, thus providing for future shortening. The leading shoots should be pruned fairly severely for several seasons to form a stiff base, but afterwards moderate topping alone is necessary. The dark-green smooth foliage and fruit are very subject to fusicladium injury, whilst the "bitter pit" is usually more prevalent in this variety than in any other popular kind grown here. The fruits are subject to malformations indicated in a crumpled eye end, popularly known as "bull nose," due mainly to only a partial fertilisation of the female organs being accomplished. It is a consistent and heavy cropper. *Climatic and soil conditions*—The climatic and soil conditions found most suitable are present in the drier portions of the fruit-growing areas of the State of South Australia, such as in the districts of Barossa, Clare, and Wirrabara, where it is the leading variety grown for export and home purposes. It blooms with Jonathan and Dunn's Seedling in early October, and is ready for shipment towards the end of March, lasting for local purposes until July and August. *Origin*—Somewhat obscure; the same apple is grown in Tasmania under the name of New York Pippin, which is not correct. The name Cleopatra was probably applied first in South Australia, where the fruit was formerly sold under the incorrect name of Pomeroy. There is much reason to believe the variety is of American origin, and possibly identical with an old Massachusetts apple called Salem. In the Government orchard at Mylor the last-named apple obtained from Leroy, of Angiers, France, appears to be identical with our Cleopatra.



POTATO SPRAYING.

TESTS AT MOUNT GAMBIER DURING SEASON 1911-12.

By G. QUINN and R. FOWLER.

These experiments were initiated by the Department with the object of trying to prove whether spraying would be of any benefit in checking the ravages of Irish blight, and incidentally any other fungus disease attacking potato plants, and whether it would pay farmers to adopt it as a general practice in this district. It was also deemed desirable to give a practical demonstration of a machine at work, and of the methods adopted in the mixing of various spraying compounds. The interest taken in this latter part of the experiment was hardly what it might have been, presumably owing to the fact that farmers were very busy at the time with the barley crops.

It was recognised by the Department that to convince farmers of any benefits to be derived from the spraying of potatoes it would be necessary to carry out the experiments in various parts of the district, so that they could personally visit the plots and see the results for themselves. With this object in view, plots were chosen representing various qualities of soil in different parts of the district, so that the tests would be as fair as possible.

The four plots chosen were in extensive fields, grown by Messrs. A. B. Sinclair, Buchanan Bros., F. Webster, and W. Hay; and our thanks are due to these gentlemen for the very willing assistance given at all times to carry out the experiments in the matter of providing horses and drivers to work the machine and cart it from place to place.

When it was first decided to carry out these tests, the Department decided to provide a motor spray pump. Recognising that perhaps the cost of a motor pump would prove prohibitive to most farmers it was, however, afterwards thought better to provide a spray pump that would probably be most used; so a Doncaster pump, made by Langwill Bros. & Davies, of Melbourne, was ordered. This pump is worked by horse power and costs somewhere about £35 to £37 10s. The Doncaster spraying machine is fitted with a vat to hold 80galls., the pump being operated by a chain working upon a large sprocket wheel attached to the main wheel and a smaller one upon a shaft from which power is transmitted to the pump rod. It is provided with five double sets of jets which are movable, and can be adjusted to suit either the width of the rows or height of the plants. It is also supplied with a fairly large air chamber, which ensures a steady and continuous pressure; but this was not provided with a stop cock, and we found in practice that when the nozzles

choked up—a trouble incidental to spraying—the pressure went down while relieving them, and the machine had to travel a chain or so before it started spraying again. This we had remedied locally, and it now works well. A patent agitator is also provided, worked by the pump action. This is a very essential part of the machine, as it is absolutely necessary for the spray compound to be kept thoroughly mixed. The machine is conveniently worked by one horse.

In each field an area of six acres was mapped out in whole acres and half-acres, the half-acre strips being left between each sprayed plot as checks, pegs being put at each end, so that when digging time came a correct record could be kept of the returns from each plot, and the benefit, if any, could be accurately arrived at.

THE SPRAY MIXTURES USED.

To make the experiments as useful as possible, we decided to use both the Bordeaux and Burgundy mixtures, and to spray two acres with each, using different strengths, one double the strength of the other. The strength of the formula generally used for Bordeaux is the 6.4.40-50, but 4.4.40, *e.g.*, 4lbs. bluestone, 4lbs. fresh lime to 40galls. water was adopted in these experiments. The Burgundy formula used was the 1.1 $\frac{1}{2}$.10, that is, 1lb. bluestone, 1 $\frac{1}{2}$ lbs. washing soda to 10galls. of water. This mixture becomes more expensive than the Bordeaux, but is easier to work through the spray pump, and is considered by some authorities to be more adhesive. The method of mixing was that usually adopted for both mixtures, and clearly described by Mr. McAlpine, Victorian Government Vegetable Pathologist, in his bulletin on Irish Blight.

As this is not a paper on spraying generally, details of that portion of the work are not entered upon; but we should like to say that it is not, in our opinion (within limits of course), so much the strength of the bluestone compounds used, but the method of mixing and the manner and time of its distribution over the plants which makes for the greatest success in checking the spread of fungus diseases. While it may be necessary that the spray should settle on the foliage in a fine mist and not in heavy drops that would probably run off, a strong pressure must be maintained to force it amongst the leaves. If the foliage is well covered and kept covered with only weak copper sprays, spores which fall on the leaves are likely to be killed as they germinate.

In our opinion the machine that will give the best results and prove the most economical, more especially in large fields, will prove to be the motor-driven pump.

The machine arrived on December 15th—three weeks or a month behind time; the potato plants were then really advanced enough for the second spraying, but fortunately the season was not a moist one, and the Irish blight had not made its appearance in the crops.

RESULTS.

The first plot treated was Mr. A. B. Sinclair's, on the 19th December, and the other plots were taken in succession. The weather at this time was not

all that could be desired, being windy and showery. Details and results are as follows:—

Mr. A. B. Sinclair's Plot—Sprayed December 19th and January 9th.

Plot No. 1.	26 rows—	Sprayed twice with 1.1 $\frac{1}{2}$.10 Burgundy gave.....	72 bags potatoes.
" 2.	13 "	Unsprayed, as a check.....	35 "
" 3.	26 "	Sprayed twice with 1.1 $\frac{1}{2}$.5 Burgundy gave	77 "
" 4.	13 "	Unsprayed	34 "
" 5.	26 "	Sprayed twice with 1.1.10 Bordeaux.....	70 "
" 6.	13 "	Unsprayed	37 "
" 7.	26 "	Sprayed twice with 1.1.5 Bordeaux	73 "
" 8.	13 "	Unsprayed	30 "

Total, 4 acres, sprayed, 292 bags; proportion large to small, 3 to 1 bags. 2 acres, unsprayed, 136 bags; proportion large to small, 2 to 1 bags. Apparent gain on 4 acres, 20 bags, or 5 bags per acre. Value at market rates, £1 13s. 4d.

Messrs. Buchanan Bros.' Plot—Sprayed December 21st and January 11th.

Plot No.			Large Potatoes.	Small Potatoes.	Total.
1.	32 rows—	Sprayed twice with Bordeaux, 1.1.10 ..	114 bags	31 bags	145 bags
" 2.	16 "	Unsprayed	62 "	10 "	72 "
" 3.	32 "	Sprayed twice with Bordeaux, 1.1.5 ..	110 "	24 "	134 "
" 4.	16 "	Unsprayed	60 "	12 "	72 "
" 5.	32 "	Sprayed twice with Burgundy, 1.1 $\frac{1}{2}$.10	113 "	23 "	136 "
" 6.	16 "	Unsprayed	50 "	11 "	61 "
" 7.	32 "	Sprayed twice with Burgundy, 1.1 $\frac{1}{2}$.5..	120 "	15 "	135 "
" 8.	16 "	Unsprayed	49 "	9 "	58 "

Total, 4 acres, sprayed, 550 bags; proportion large to small, 4.91 to 1 bag. 2 acres unsprayed, 263 bags; proportion large to small, 5.26 to 1 bag. Apparent gain on 4 acres, 24 bags, or 6 bags to the acre. Market value at digging time, 7s. per bag, £2 2s. per acre.

Mr. F. Webster's Plot—Sprayed December 23rd and January 17th.

Plot No.			Large Potatoes.	Small Potatoes.	Total.
1.	28 rows—	Sprayed twice with Bordeaux, 1.1.10..	94 bags	11 bags	105 bags
" 2.	14 "	Unsprayed	48 "	3 "	51 "
" 3.	28 "	Sprayed twice with Bordeaux, 1.1.5 ..	90 "	8 "	98 "
" 4.	14 "	Unsprayed	38 "	5 "	43 "
" 5.	28 "	Sprayed twice with Burgundy, 1.1 $\frac{1}{2}$.10	87 "	11 "	98 "
" 6.	14 "	Unsprayed	39 "	5 "	44 "
" 7.	28 "	Sprayed twice with Burgundy, 1.1 $\frac{1}{2}$.5	91 "	12 "	103 "
" 8.	14 "	Unsprayed	32 "	4 "	36 "

Total, 4 acres, sprayed, 404 bags; proportion large to small, 8.61 to 1. 2 acres, unsprayed, 174 bags; proportion large to small, 9.23 to 1. Apparent gain on 4 acres, 56 bags, or 14 bags per acre. Value at market rates, £4 18s. per acre.

Mr. W. Hay's Plot—Sprayed December 23rd and January 17th.

Plot No.			Large Potatoes.	Small Potatoes.	Total.
1.	26 rows—	Sprayed twice with Bordeaux, 1.1.10..	57 bags	19 bags	76 bags
" 2.	13 "	Unsprayed	26 "	12 "	38 "
" 3.	26 "	Sprayed twice with Bordeaux, 1.1.5 ..	64 "	18 "	82 "
" 4.	13 "	Unsprayed	23 "	9 "	32 "
" 5.	26 "	Sprayed twice with Burgundy, 1.1 $\frac{1}{2}$.10	67 "	18 "	85 "
" 6.	13 "	Unsprayed	32 "	10 "	42 "
" 7.	26 "	Sprayed twice with Burgundy, 1.1 $\frac{1}{2}$.5..	75 "	14 "	89 "
" 8.	13 "	Unsprayed	34 "	8 "	42 "

Total, 332 bags from 4 acres, sprayed; proportion large to small, 3.81 to 1. 154 bags from 2 acres, unsprayed; proportion large to small, 2.94 to 1. Apparent gain, 24 bags, or 6 bags to the acre. Market value, £2 2s. per acre.

The plot on Mr. Buchanan's farm was badly frosted late in the season, the tops being almost completely cut back while quite green, so that to a very large extent any benefit that would have resulted to the crop from the protective influence of the spraying was lost as the plants did not die off naturally.

COST OF SPRAYING.

The quantity of spraying material used per acre varies a little according to circumstances, but we found during these experiments that the amount per acre usually worked out at 80galls. We, however, consider 100galls. per acre, when the plants are well grown, would cover them more effectively. If we calculate the cost of materials for each spraying of 80galls. per acre, without taking into account the cost of applying it, the result is as follows:—For Bordeaux, 1.1.10, 8lbs. bluestone at 3½d. lb. or 30s. cwt., 2s. 4d.; 8lbs. lime, say 2d.; total, 2s. 6d. For Bordeaux, 1.1.5, double the above, 5s. For Burgundy mixture, 1.1½.10, 8lbs. bluestone at 3½d. lb. or 30s. cwt., 2s. 4d.; 14lbs. washing soda at 8s. cwt., 1s.; total, 3s. 4d.; double strength, 1.1½.5, 6s. 8d.

GENERAL CONCLUSIONS.

To indicate the rate at which spraying may be done with the machine, when in good order and spraying material ready, we started (in Mr. Hay's) at 1 o'clock p.m., and finished in four hours, having to walk over a quarter of a mile back to the water supply to fill up. The actual time taken to empty the machine and spray one acre was usually from 25 to 30 minutes, and about the same time to go backwards and forwards and fill up the vat. The only record put up was in Mr. Hay's at the last spraying, the time occupied over the four acres being three and a quarter hours. Like all other farm operations, a lot depends on whether the machine used keeps in good order; and spray pumps are just as liable to stick up as seed drills, harvesters, &c.

Analysing the figures, we find that there is very little difference between the full strength and half strength. In Messrs. Sinclair's and Hay's plots the strong solution gave the best results, but in Mr. Webster's it is just the opposite; so that it is doubtful if it will pay to use double strength. It was our intention to have sprayed a third time, but just when this should have been done we were in the middle of a severe heat wave, which did so much injury to the plants that it was deemed not worth while going on with it.

On the above basis the cost for spraying an acre of potatoes three times with ordinary Bordeaux mixture should not exceed 13s. 6d., made up of spraying materials, 7s. 6d., pay of driver and an assistant to mix the spray compound, use of horse, and general wear and tear, 6s.—total, 13s. 6d. Although the use of washing soda in lieu of lime would involve an outlay of 2s. 6d. per acre extra for the same work, we are disposed to believe the saving of time by its use, as against procuring, keeping, slaking, and straining the latter, combined with the more frequent losses of time and temper caused by stoppages due to the lodgment of grit from lime in the nozzles, would work out in favor of the use of the soda compound.

As the season proved extremely dry and most unfavorable for the development of the Irish blight, the main factor which we set out to investigate was not forthcoming. The indirect results obtained, which we believe may be attributed to the use of the copper compounds, were somewhat informative, the leaves, and more particularly the stems, remaining green considerably longer on the sprayed than on the unsprayed rows. It may not be unfair to assume that the increased proportion of tubers in the sprayed plots was due to this prolonged period of assimilation, apparently made possible by the presence of the copper compounds. In the light of recent European investigations it cannot be claimed that the assimilative powers of the sprayed plants had been increased beyond those of the unsprayed checks, but were simply prolonged. It is the intention of the Horticultural Section to repeat the tests upon similar lines during the coming season, but the spraying will be commenced at an earlier stage in the growth of the potato plants.

MARKETING APPLES AND PEARS.

Report by TRADE COMMISSIONER.

The Trade Commissioner (Major A. E. M. Norton) has forwarded the following report on the marketing of apples and pears in reply to various statements which have appeared in the Australian press in reference to the vast difference there seems to be between the prices Australian shippers receive for their fruit and those charged by the retailers throughout England:—

It has been so often stated by Australians returning to their native States from England that while Australian apples and pears are sold in Covent Garden and other markets at prices that are almost unpayable, they have noticed the same fruit being sold in baskets in Bond and Regent Streets at prices which work out at 2d. to 6d. for each apple and pear, and all through the London suburbs and in the provinces small sound Australian pears are selling at 3d. apiece, and Australian apples from 4d. to 6d. per pound, and in consequence there must be some huge profits for these retailers.

Taking last season, for instance, the inference is that fruit sold at about 7s. to 9s. a case in Covent Garden was eventually retailed in London at 2d. to 6d. each, and in the provinces at about 5d. per pound, thus showing a profit to the retailer of something like 7s. 6d. a case.

These statements are very misleading, and prove that the little knowledge gained by the persons interviewed is very dangerous to the wellbeing of the producers.

It has been my business for about six years to look after the South Australian producers' interests in England, and I may say that I have made exhaustive investigations in regard to the marketing of fruit, both wholesale and retail, throughout the United Kingdom and the Continent, and as a result of these investigations I have come to the conclusion that the retailer here gets precious little of the "gilt."

The statements are not explicit enough to mention the variety and quality of apples and pears seen ticketed up in Regent Street at 2d. or 6d apiece, neither do they state the varieties or condition of the apples that averaged comparatively such low prices in Covent Garden. They single out a few of the most expensive shops in London—shops which are patronised by the class of people who would just as soon pay 2s. as 2d. for an apple if it were something they fancied. The number of this class of shop can be counted on the fingers of one hand, and the quantity of fruit they could take for the whole of the season is infinitesimal compared with the general supply—a "mere drop in the sea." The apples one sees in the shops referred to are Cleopatras or Jonathans. On looking up the average price for these varieties for the last week in April I find it to be about 9s. 6d. per bushel. They take it for granted that a retailer is able to sell 40lbs. of apples out of every case, though if put down at 30lbs. he would be nearer the mark.

Since I came to England the first time I have seen hundreds of cases turned out, and I can assure you that, weighing them in bulk, the average is anything between 36lbs. and 38lbs. net. It is quite the exception for a case to weigh 40lbs. net. It will be remembered also that the retailers have to weigh out in single pounds, hence my reason for saying that 30lbs. will be nearer the mark than 40lbs. The reports also generally assume that every apple in every case will turn out sound and be fit to sell at 5d. per pound. This also is far from being correct. It is the exception rather than the rule for a retailer to get all the apples out of any one case fit to sell at full price. There are always some in every case that have to be sold at "cooking" prices. For instance, say a man buys "Cleos" at 9s. 6d. per case, by the time he allows for the actual weight he is able to get out of a case and the waste, the fruit will cost him more like 3½d. to 4d. per pound. It will accordingly be seen that the retailer after all does not get too much "gilt."

During the past season I have personally sold thousands of cases of Cleopatras and Jonathans, and the lowest price that I took for any that were sound was 8s. per case, and the average was well above 9s., and I do know that a large quantity were sold at 4d. per pound retail in order that the purchaser might keep "clear decks." Remarks in regard to the retail price of pears is still further evidence of lack of knowledge. Last season pears

that were in any way sound were realising 24s. per bundle at auction, or about 7d. per pound. My experience as a shipper, from when the industry commenced, and a seller this end for six years, has shown me that the reason for the alleged poor returns is because there is considerable fault both ends, and I consider it is not to the interest of the producers to lead them to believe that it is due entirely to methods of handling at this end or to the retailer. That the producer has suffered through having unnecessary charges piled up on him in London I am well aware, and on many occasions pointed out where the trouble lies, and also suggested remedies. Such remedies, however, the producers, I regret to say, have been slow to adopt. Co-operation on the part of the growers has been very strongly urged for some years past, and until the growers fully realise the importance of this movement I fail to see how they are to get the control which will enable them to regulate the selling this end, or improve the methods of grading and packing their end.

I am not losing sight of the fact that in South Australia there is a number of most careful packers whose fruit on arrival in England is a credit to themselves and the State. At the same time we cannot shut our eyes to the fact that the number of indifferent packers predominates. It is the very large quantity of badly graded and packed fruit that is an important factor when considering the causes for low prices. To a very large extent the benefit derived as a result of good packing is considerably discounted by the heavy supplies of poor quality and damaged fruit. I do not wish to again refer to the faults which unfortunately obtain, but I may mention an instance of defect which came under my notice this last season in regard to one parcel that was consigned to me. The specification indicated that in the shipment there was really fine fruit. In the circumstances I communicated with some of the best buyers in London, telling them that I expected some fruit of special quality by the incoming ship, and requested them to hold off buying elsewhere until they had seen these apples. An inspection of the fruit on arrival revealed something quite different from what was anticipated. All the cases were branded in bold letters "FINEST SELECTED," but the contents of the case could not have been considered even fair average quality, and the largest of the apples did not exceed 2½in., while they were all packed on the slack side. I am aware that the average of the fruit grown in South Australia during the past season was small, a defect for which the growers were not responsible; but the grievance this end was that growers or packers should try to make up with the stencil plate the deficiencies of nature.

Amongst the many great advantages to be gained by co-operation the following are two very important factors:—The number of marks would be reduced to a minimum; distribution this end could be controlled in such a way that at no one centre need there be an undue accumulation.

DISEASES OF FARM ANIMALS.

RINGBONE.

By F. MURRAY JONES, L.V.Sc., Assistant Veterinary Surgeon.

What is ringbone ? In what form does it occur and how does it affect our stock ? What remedial or preventive measures may be adopted ? The answer, briefly, to the foregoing questions in a simple and non-technical manner is the object of the following article.

Ringbone is a term given to an abnormal growth or deposit of bone upon the pasterns. These bones are two in number, and spoken of respectively as the upper, or long, and the lower, or short.

All breeds of horses are liable to ringbones, but heavy draught horses are especially liable, as their bones are more upright and shorter than those of the blood horse, and concussion is more violent as a consequence. The arrangement or anatomical construction of the horse's foot and leg is such as to minimise the chances of concussion and subsequent inflammation. In spite of this natural provision we must at the same time remember the artificial surroundings and the severity of his labors on modern macadamised roads, conditions oftentimes out of proportion with the most generous provisions made by nature.

Ringbone may occur on the front or hind pasterns ; it may be on the upper bone, when it is called " high ringbone," or on the lower just above the hoof, when it is denominated " low ringbone." Confusion must not be made with another condition known as sidebone, a subject which has been dealt with in a previous article.

It must be remembered that the growth of ringbone is from without and not from within the bone. This bony substance originates from a thin membrane, technically known as periosteum, which covers the bones. It is by concussion of this membrane by such causes as severe work on the hard roads, &c., which inflames and stimulates its function of producing bony material. This is really an excess of calcareous phosphatic matter, which becomes deposited around the bone. This is actually caused by a greater strain than the existing bone could endure. It is really a process destined to prevent a recurrence of the strain by providing against a like contingency.

A great many horses are naturally predisposed to the occurrence of ringbone ; that is to say, have inherited a natural weakness in the bones, to be followed by the presence of a ringbone under the most favored of conditions. This is generally found to be the case with soft spongy round-boned animals.

In the latter cases it is no uncommon experience to find other bone affections, such as spavin, splint, and other exostoses, as these are called, associated in the same animal, at once pointing to some constitutional weakness in the bone structures.

The effects on our equine stock are wider and more general than may at first be imagined. By no means is it an easy task to assemble at a short notice half a dozen of the hairy or heavy type of horse absolutely free of this trouble. Although many affected are able to work, yet it is an undeniable fact that their years of active usefulness are greatly curtailed by reason of its presence. This reduction in the animal's years of usefulness represents a fair sum of money to owners and workers of these expensive animals.

SYMPTOMS.

In an animal affected with ringbone certain peculiarities are shown in the gait or mode of progression. In the first place there is an alternating stilty action of the limbs. If this form of trouble should be present in the front feet it will be found that there is a strong tendency to move forward on the heels ; by so doing the animal is endeavoring to avail himself of the benefits of the frog pads in lessening the jarring or concussion. In the event of the trouble existing in the hind limbs, the tendency to move forward on the toes will be shown.

In the early stages of forming ringbone the lameness is generally continuous and acute. Later on, in the more chronic form, the lameness, although being present in a varying degree, is more of a mechanical than a painful character.

TREATMENT.

How can we remedy this condition ? Well, in the first place surgical and mechanical methods are beneficial only in a very small degree. In the case of incipient ringbone—that is one just forming—the best way is to spell the animal and apply wet packs to the part, or turn the animal out for a long rest in a suitable paddock. Blistering for cases of older standing has been recommended, but the results are not always gratifying.

From the shoeing standpoint something may be done to alleviate the lameness. In practice, the affixing of a bar shoe to feet has been found beneficial. In the case of the front feet draw the shoe out very thin at the heels. In the case of hind feet let the shoe be fairly thick at this part. Sometimes the interposing of patent rubber pads between the shoe and the feet has been beneficial by lessening concussion.

In spite of the foregoing advice we must not lose sight of the fundamental fact that horses affected with ringbone are suffering as the result of an hereditary taint. If we are serious in our desire to reduce our percentage of affections of this sort we must aim at the cause, and the cause in the past has been faulty selection; that is to say, breeding has been done in a great many cases from animals affected with hereditary ringbone. It should be the ideal of the horsebreeder to breed sound animals, and the only way to reach this ideal is to breed from sound stock. As a means towards that end owners of stud animals should avail themselves of the Government certificate awarded in accordance with the condition of soundness. The natural result will be an enhanced value of the service of the qualified animal to all intending breeders. By adopting a rigid adherence to the principle of breeding from only selected sound animals much will be done to mitigate the evil of our subject, and the shrinkage of that high percentage of hereditary bone troubles, only too rampant in horses of the present day.

POULTRY NOTES.

BY D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR OCTOBER.

THE ALL-ROUND BREEDS.

While the egg production branch of the poultry industry in this State is making very satisfactory progress there can be no other conclusion than that the table bird section requires reviving. The marvellous perfection attained by many prominent strains of Leghorns in the matter of egg production has led to false conclusions. It seems to be the general opinion that egg production is the only branch of the industry which pays, and that there is no money in table poultry. This mistaken view has been furthered by certain breeders of White Leghorns, who naturally seek to influence all the business they possibly can. Many others, who ought to know better, assume that a hen's value lies in the number of eggs she can lay. We are apt to compare the great strides egg production has made in this State with the reverse as existing in England and elsewhere. It must not be forgotten, however, that in other countries an equal and perhaps greater production per capita can be shown in the shape of market table poultry of very high quality. Owing to circumstances South Australia has a large exportable surplus of

eggs, and in that respect is unique among the States. She, however, is behind Victoria and New South Wales in the production of table poultry. A great many people ill-advisedly blame the introducers and breeders of the laying strains of Leghorns, also they blame the laying competitions. These conclusions are wrong. By all means let us develop egg production to the fullest extent. We have markets for unlimited quantities at most profitable prices. But we have also excellent markets, both local and export, for more prime table poultry than ever we are likely to produce.

The local market offers great encouragement, because consumption is increasing rapidly and retailers are often hard put to supply the demand. As regards really prime table chickens, they are practically unknown in Adelaide. Good fairly-fleshed young birds are often brought to market by the breeders, but really well and properly fattened chickens are unknown. Chickens turkeys, and ducklings are all sold by weight nowadays—in the trade at least—and it will pay to breed and fatten well the right class of birds.

The export market has been well exploited, and it has been amply proved that remunerative prices can be obtained for good quality. In fact, prices were obtained last year which were far in advance of what were ruling in Adelaide markets prior to the opening of the export trade. The growth of local demand, however, caused such enhanced prices that breeders neglected the export trade, which showed signs of falling off. Then again, for export, only prime well-fattened chickens are suitable. The local market buyers are by no means fastidious, and will pay for large fairly fat chickens without much regard to prime quality.

What breeds? This is a question frequently asked. There is a fair range of breeds from which to choose. Wyandottes are generally suitable for private families and for farm stock, as well as for the large breeder. Ordinary Wyandottes are good layers—the hens of some strains are better layers than others. The Wyandotte chickens fatten easily and make first-class table birds. Too much attention need not be paid to egg production. Birds of good type should be selected, and from 150 to 160 eggs per hen per annum should satisfy the breeder. This average will be for numbers and for a series of years. Orpingtons have always been popular, but, in many cases, the hens are indifferent layers and soon become over fat. At our laying competitions there are always to be seen Orpingtons, of good type and appearance, which lay satisfactorily. The black is the most popular variety, but those who breed the White Orpington are loud in its praise. In choosing specimens of either variety for commercial purposes, the over-large, heavily-feathered specimens should be discarded. You will find that even medium-sized hens will get very fat in their second and third year unless fed with proper care. At the same time there are many so-called laying strains of Orpingtons which are not only undersized, but, as proved in the laying competitions, the hens lay undersized eggs. These strains have been built up by a method of selec-

tion for number of eggs only, and little regard, if any, has been paid to other desirable points. Fowls bred upon faulty methods soon degenerate into worthless mongrels. The originator of the Orpingtons had in view various varieties of an all-round breed.

Plymouth Rocks are both handsome and useful, but are being bred more upon show than upon utility lines. A few years of careful breeding with proper regard for egg yield should place this breed upon a good footing. The chickens are excellent table birds, and the hens lay fine-sized brown-shelled eggs.

The Faverolles fowl has never become popular in this State, although the hens are fair layers of fine eggs. For table bird production the breed is in the front rank.

Langshans, if of the Croad type, are fine layers of dark-brown eggs, and the chickens are excellent for table, although rather slow growing.

Cross-breeding may be recommended, because of the use of Indian or Old English Game, or even low-set Malay male birds, mated with Wyandotte, Orpington, Plymouth Rock, Langshan, or Faverolles hens, very fine plump-breasted chickens can be produced. These command very high prices in Adelaide and are excellent for export.

This season is nearly over, but it is not yet too late to arrange for a few sittings of eggs with a view to further experience. Table bird breeding entails no more labor than is necessary in looking after laying hens kept for egg production. The need for advancing this section of the industry is great, and furthermore the profits are excellent, and the "crop" is a short one. All chickens can be grown, fattened, and sold by the end of five months at the latest.

Early hatching has proved profitable, and in this respect it is advisable to obtain some breeding stock so as to be in readiness in March or April. At the end of the breeding season it is generally possible to obtain good stock at a moderate outlay.

Warm weather will soon be experienced and the poultry will need proper protection from the heat of the sun. This may be provided by means of shelters made of brushwood, straw and wire netting, or by canvas (split wheat bags) on timber frames, or permanent structures may be made of galvanized iron. Many poultry keepers needlessly expose their poultry when they could be made comfortable at a trifling outlay.

INCREASED PRODUCTION.

There is room for unlimited production of eggs and table poultry of all sorts. The demand throughout the world is influencing the markets. The United States of America produced eggs and poultry last year valued at two hundred million pounds sterling, and still this was not enough, for they were forced to import to the value of £600,000. If every poultry breeder

in this State were to produce, during the next few years, 100 eggs and 100 table chickens for every one now produced there would be no glut ; no reduction in prices. What was not required for local and interstate demands would be absorbed for export. Many firms would embark on the export trade, and competition means better prices for good quality. What we need is production. Speaking of the American production, a well-known authority said, " and for the coming year it is safe to say that poultry will produce more money than ever. People are going to eat more eggs and more poultry than heretofore. They don't want so much of those packing house products whereof we have read so much during the past few months. Just pin this fact to the inside of your hat band, and figure to increase your flock of chickens as much as you can. You'll be bound to be a winner. If you have no chickens, and have a place to keep some, don't lose any time in making a start and utilise your spare time for what is sure to be some 'easy money' for several years to come." The advice is equally apropos of the circumstances ruling in Australia.

FORWARDING EGGS TO MARKET.

Poultry keepers who have not done so would be well advised to obtain, from the Produce Department, Adelaide, some modern egg boxes. These are fitted with cardboard partitions to hold 25doz. No chaff is needed, only the woodwool pads provided. The risk of breakages is very slight. These cases are far superior to ordinary kerosine cases. They cost 2s. 6d. each, and will last for years.



EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended September 30 h.	Total Eggs Laid from April 1st, 1912, to Sept. 30th, 1912.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Cowan Bros., Burwood, N.S.W.	135	688
Tabuteau, J. O., Black Rock, Melbourne	113	533
Hodges, H., Pvalong, Victoria	135	532
The Range Poultry Farm, Toowoomba, Queensland	138	579
Brundett, S., Moonee Ponds, Victoria	137	575
Jessup, W. C., Caulfield, Victoria	116	526
Dawes, J. H., Granville, Sydney	127	647
Beadnall Bros., Gawler	134	672
Redfern Poultry Farm, Caulfield, Victoria	141	445
Kerr, R., Longwood, S.A.	148	654
Eckermann, W. P., Eudunda	131	587
McNab, J. A., Sandringham, Victoria	110	526
Mazey, P., Alberton	110	426
Broderick, P. J., Gawler	104	483
Redfern Poultry Farm, Caulfield, Victoria	117	473
Braund, J. E. and H. J., Islington	115	446
Dunn, L. F., Keswick	120	501
Hocking, E. D., Kadina	95	477
Groom, E., Peterhead	72	472
Pope, R. W., Heidelberg, Victoria	137	634
Haimes, T. F., Fullarton Estate	119	426
Provis, W., Eudunda	134	499
Burton, W. S., Moonta Mines	138	492
Broster, G., Mallala	138	497
Brain, J. H., South Yan Yean, Victoria	130	521
Sargenfri Poultry Yards, East Payneham	141	655
McKenzie, H., Northcote, Victoria	138	591
McDonnell, J., Greytown, Rosewater	128	600
Browne, A. R., Hawke's Bay, N.Z.	127	613
Brain, J. H., South Yan Yean, Victoria	131	438
Marsden, C., Welland	109	368
Hutton, C., Parkside	125	492
Miels, C. & H., Littlehampton	123	449
Moritz Bros., Kalangadoo	118	566
Troughbridge Poultry Yards, Edithburg, Y.P.	124	478
Irvine, A. W., Epsom, Auckland, N.Z.	113	501
Walker, P., Hicksborough, Victoria	114	484
Lampe, B., Kadina	100	323
Waite, F. J. O., Nailsworth	133	698

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended September 30th.	Total Eggs Laid from April 1st, 1912, to Sept. 30th, 1912.
SECTION I.—LIGHT BREEDS—<i>Continued.</i>		
WHITE LEGHORNS—<i>Continued.</i>		
Badcock, G., Mile End	119	414
McClelland, A., Mordialloc, Victoria	108	389
Tomlinson, W., Clarence Park	122	488
Roberts, L. L., Kadina	131	467
"Strathcona," Long Plain	131	520
Whitegate Poultry Farm, Deepdene, Victoria	109	498
Purvis, Miss Gracie, Glanville	132	527
Padman, A. H., Hyde Park	134	561
Sickert, P., Clarence Park	131	540
Purvis, W., Glanville	133	549
Rice, J. E., Cottonville	130	629
Hamill, H., Kogarah Bay, Sydney	128	450
Gurr, W. E., Kapunda	125	515
McLeish, E., North Adelaide	131	470
Craig Bros., Hackney	130	548
Uren, Mrs. P. A., Kapunda	146	769
Perry, Wm., Murrumbeena, Victoria	131	433
Nancarrow, J. T., Port Adelaide	117	426
Bertelsmeier, C. B., Clare	123	548
Tockington Park Poultry Farm, Grange	131	585
Trenwith, T. H., Kadina	128	390
Knappstein & Bray, Clare	129	391
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	129	479
"Deneshollow," Caulfield, Victoria	116	451
Hill, Chas., Monarto South	82	322
"Islay," East Malvern, Victoria	123	431
Cosh, A. J., Burnside	129	560
Indra Poultry Farm, Freeling	125	455
Whitrow, A. J., Knoxville	103	524
Hall, T. C., Rose Park	113	555
Ontario Poultry Farm, Clarendon	123	490
Howlett, H., Moonta	139	474
"Koonoowarra," Enfield	114	600
Hall, A. W., South Oakleigh, Victoria	124	586
Convent of the Good Shepherd, Oakleigh, Victoria	118	415
Carne, E. A., Kangaroo Flat, Victoria	141	507
Navan Poultry Farm, Minlaton	112	394
Lillywhite, R. G., Fullarton	128	521
Gibbs & Pine, Queenstown	112	311
Hughes, J. J., Elsternwick, Victoria	124	381
Shamrock Poultry Farm, Perth, W.A.	120	422
Bertelsmeier, C. B., Clare	135	461
Nancarrow, J. T., Port Adelaide	142	492

SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

Robertson, F. H., Northam, W.A.	89	352
McKenzie, E., Northcote, Victoria	73	340
Mitchell, B., Bendigo, Victoria	95	335
Provis, W., Eudunna	109	389
Kenway, D., West Pennant Hills, Sydney	111	504
Cowan Bros., Burwood, N.S.W.	113	501
Kenmore Poultry Farm, Dandenong, Victoria	110	309
Brundett, S., Moonee Ponds, Victoria	116	409
Cant, E. V., Richmond	129	482

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended September 30th.	Total Eggs Laid from April 1st, 1912, to Sept. 30th, 1912.
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SECTION II.—HEAVY BREEDS—*Continued.*BLACK ORPINGTONS—*Continued.*

Craig, Mrs. C., Hackney	105	389
Lampe, B., Kadina	113	340
Wirraparinga Poultry Yards, Plympton	105	358
Phillips, A., Portland, S.A.	115	326
Martin, B. P., Unley Park	119	520
Nancarrow, J. T., Port Adelaide	55	217
Padman, J. E., Plympton	119	474
Francis Bros., Fullarton	134	325
Hall, T. C., Rose Park	98	461
Tockington Park Poultry Farm, Grange	100	361
Bertelsmeier, C. B., Clare	94	428
Craig Bros., Hackney	103	484
Bertelsmeier, C. B., Clare	90	371

SILVER WYANDOTTES.

Dunn, L. F., Keswick	107	509
Tidswell, H. J., Mitcham Park	72	473
Moyes, S., Blyth	91	378
Perry, Wm., Murrumbena, Victoria	100	360
"Denehollow," Caulfield, Victoria	94	423
Western, F. C., Marion	93	536

SALMON FAYEROLLES.

Courtenay, K., Mordialloc, Victoria	81	452
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LANGSHANS.

Stevens, E. F., Littlehampton	105	467
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PLYMOUTH ROCKS.

"Koonoowarra," Enfield	123	339
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SECTION III.—SCRATCHING SHED SECTION.

WHITE LEGHORNS.

Sickert, P., Clarence Park	132	562
Tomlinson, W., Clarence Park	138	638
Moritz Bros., Kalangadoo	119	458
Codling, H., Mitcham Park	115	462
Sargenfri Poultry Yards, East Payneham	100	474
Purvis, W., Glanville	124	484
Bertelsmeier, C. B., Clare	128	529
Padman, A. H., Hyde Park	129	600
Hocking, E. D., Kadina	129	447
Beadnall Bros., Gawler	124	427
Brain, J. H., South Yan Yean, Victoria	99	333
Provis, W., Eudunda	126	504
Redfern Poultry Farm, Caulfield, Victoria	109	539
Broderick, P. J., Gawler	127	420
"Koonoowarra," Enfield	124	399
Lillywhite, R. G., Fullarton	123	465
Cosh, A. J., Burnside	104	432
Indra Poultry Farm, Freeling	119	455
Whitrow, A. J., Knoxville	131	463
Tockington Park Poultry Farm, Grange	125	516

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended September 30th, 1912.	Total Eggs Laid from April 1st, 1912, to Sept. 30th, 1912.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	140	643
Dow, A., Glencoe West	127	646
McNamara, Mrs., Mount Gambier	128	499
Moritz Bros., Kalangadoo	139	746
"Mahama," Mount Gambier	118	570
Holmes, F. A., Frances	131	607
Sudholz, A., Kalangadoo	114	483
Staunton, S., Naracoorte	104	441
Hall, C. W., Mount Gambier	139	578
Moritz Bros., Kalangadoo	134	653
Vorwerk, K. E., Millicent	137	584
Vorwerk, H. F. & A. C., Millicent	134	583
Jarrad, J., Mount Gambier	150	549
Bartram, T. A., Kybybolite	125	654
Vorwerk, H. F. & A. C., Millicent	107	473
Jenkins, R. D., Kybybolite	126	434
Arthur, J. S., Bordertown	117	534
Drake, C., Naracoorte	134	516
"Eurinima," Kybybolite	134	615
Smith, M., Hynam	111	465
Lacey, F. C., Kybybolite	140	772
"Herdfield," Mount Gambier	146	676
Blue Lake Poultry Farm, Mount Gambier	136	487
Beaton, W. J., Tantanoola	130	538
Bennett, E., Kalangadoo	119	408
Jones, H. F., Mount Gambier	122	449

MINORCAS.

James, S. T., Mount Gambier	112	279
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdfield," Mount Gambier	131	485
Blue Lake Poultry Farm, Mount Gambier	84	367
McNamara, Mrs., Mount Gambier	49	219

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	113	432
Osborne, W. F., Kalangadoo	127	476

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	145	233
Glenelg River Poultry Farm, Mount Gambier	110	265

NOTES ON EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

Despite exceptional weather the progress made by all sections in each test during the month of September has been good. The appended reports of the Superintendents show that there is a considerable improvement over the results obtained during the same period last year. A most satisfactory point is to be noted in the excellent prices which have been paid for market eggs this season. The result will, no doubt, show a better margin of profits.

ROSEWORTHY.

The Superintendent reports—The general health of the birds is good. One hen in section 1 died during the month from crop trouble and one had to be killed, suffering from paralysis. The former hen has been replaced, but the latter has not. One hen in section 3 was afflicted with cyst, and one was badly strained; both have been killed at owner's request and birds have been replaced. I have to record five broodies in section 1, 58 in section 2, and one in section 3; total 64. The average maximum temperature for the month was 68.14°, and the highest reading 83.4°; the average minimum was 41.29°, the lowest reading being 29.7°. Wind, with more or less force, blew on 28 days—on 13 from the south-west, 10 from the north-west, four from the west, and on one day from the south. Rain fell on 17 days, the registration ranging from 1 to 63 points; total registration, 2.43in. The laying has maintained a fair average. The number of eggs laid by the 804 hens was 15,863 for the month, against 15,262 for August. The total number laid to date is 63,996. The feature in the month's work has been the consistent laying by the leading pen of birds, which laid 146; this was also the highest score for the month.

KYBYBOLITE.

The Superintendent reports—The general health of the birds has been good, though three deaths have occurred. These were all due to ovarian troubles. There has been a great improvement in laying on that of last month, and the average per pen is over 100 eggs better than for the same period of the last competition. The leading pen is still doing good work and is being closely followed by a second pen. The month's yield was as follows:—Section 1, 3,452; section 2, 759; total, 4,211. The early part of the month was very windy, wind coming from all quarters. Over 5in. of rain fell during the month, and about 4in. in one fall. The birds are still housed and so did not feel the effect of the wind and rain to the same extent they otherwise would have. The minimum temperature was 34° with a maximum of 74°. Wind was registered on all but four days.

1913-14 COMPETITIONS.

Copies of regulations and form of entry are now obtainable on application to the Poultry Expert, Adelaide. Farmers, pastoralists, fruit and vegetable growers have been allotted a special section.

BULLETIN ON THE POULTRY TICK.

The article which appeared in the *Journal* has been reprinted in bulletin form. Copies will be forwarded on receipt of stamp. This bulletin should be carefully studied by all poultry-breeders.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, September 4th, there being present Messrs. A. M. Dawkins (Chairman), C. J. Valentine, C. J. Tuckwell, Geo. Jeffrey, G. F. Cleland, F. Coleman, Col. J. Rowell, Professors Lowrie and Perkins, and G. G. Nicholls (Secretary).

LICE ON SHEEP.

Mr. Valentine intimated that the committee appointed to go into the question of lice-infested sheep had had an interview with the Chief Inspector of Stock (Mr. T. H. Williams), who had gone to the Crystal Brook district with a view to make inquiries and to lecture before the Port Pirie Branch of the Bureau. There was ample power under existing legislation to compel owners of infested sheep to dip the animals. Without doubt, lice were very bad in a large number of flocks, and the parasites were spreading rapidly among the Merinos. The only way to effectually destroy the pest was to dip in a poisonous dip, and it was necessary that the first of the two dippings should be made within a month of shearing. Professor Perkins said that if it was done immediately after the sheep had been shorn with machines in many instances blood poisoning would occur. Mr. Jeffrey said that on the stations the dipping took place promptly after the shearing, the principal reason being that the sheep were then all together, and the operation could be performed with greater facility than otherwise would be the case.

CARRIAGE OF SHELLS AND LIME.

The Secretary reported that the Railways Commissioner had agreed to transport lime for agricultural purposes as well as sea shells in 6-ton lots at the same rate as superphosphate, viz., M class, less 20 per cent.

VETERINARY INSTRUCTION.

The Secretary reported that the veterinary classes were being commenced on that day, Riverton being the first one arranged for. The Director of Agriculture mentioned that until the end of October the only townships visited, besides that named, would be Blyth, Lyndoch, and Angaston. During the Roseworthy College vacation, however, four or five other places farther afield would be included. To begin with, only four lectures were being given at each place. Mr. Jeffrey expressed the opinion that the classes would be a great success. Mr. Coleman asked whether it would entirely remove any possibility of State-subsidised veterinary surgeons being stationed at different

centres. He considered that the eagerness with which the scheme of lectures had been accepted demonstrated that there was a great need for qualified veterinary surgeons in certain localities. The Saddleworth Branch, of which he was a member, was deeply interested in the matter. Mr. Cleland thought the stockowners should emulate the example of the vigneron and contribute to a fund which would enable them to secure the services of veterinary surgeons where they were most needed. Professor Lowrie said the policies concerned were those of two different Governments. The present scheme of veterinary lectures he put forward when he undertook the direction of the Agricultural Department, without any knowledge that any other scheme had been discussed or even contemplated. He realised that there was a great need for the farmers to be helped in such a way that they would know how to avoid diseases and to treat simple complaints when these occurred. A lot of stock were now lost through lack of a little elementary veterinary knowledge and by the administration of quack remedies. The purpose of the lectures was not to qualify those who attended them to become veterinary practitioners. It was well known that a long and arduous course of study was essential to enable a man to become a fully qualified veterinary surgeon, a course which was almost as expensive as that required to secure a medical degree.

Scattered Population.—A great difficulty in South Australia was that the population was so widely scattered that there were few districts which afforded an opportunity for a man to earn a good living practising as a veterinary surgeon. The appointment of State-subsidised veterinarians would be all very well for the stockowners in the immediate neighborhood, but what about the men 50 and more miles away? Further, was it likely, seeing that the veterinary surgeons appointed would probably want to do all in their power to build up big private practices, that they would give out the best of their knowledge and information in the form of lectures? Certainly not. If, as had been suggested, a subsidy of, say, £100, would be sufficient to ensure the services of a qualified practitioner, surely in a district like Strathalbyn there were 40 farmers who could subscribe £2 10s. each to make up the requisite amount. If the scheme was justified, let them put the money into it themselves. Personally, he did not think that they would get a good veterinary surgeon to look at it on those terms. In New Zealand, in some instances where veterinarians were privately subsidised, the salaries ranged up to something like £600 or £700 per annum. There, of course the population was more concentrated and 10 times as many head of stock were maintained on an equal area. To subsidise men on the scale outlined in the proposed scheme would bring to the State only young fledglings anxious to gain experience, and who would use the positions merely as stepping-stones to better things. It would be practicable, however, for the farmers who wished to have a veterinary settle among them to club together with

the object of obtaining the services of qualified men in the different districts, and such organizations would not be interfered with by the present scheme of lectures. Indeed, in all probability this would help considerably to awaken the farmers to a greater realisation of the advantage of having professional attention when their stock needed it. Mr. Jeffrey expressed his delight at the information given. He appreciated the force of the many points which had been emphasized. Mr. Coleman, while admitting the value of the veterinary classes, thought something might be done on the lines indicated by Mr. Cleland.

BERSEEM.

A summary of the results of experimental sowings of Berseem (Egyptian clover) seed made by various growers was presented by the Secretary, who stated that in most cases the seed had been put in without irrigation, and the plants, which had suffered very much from frost, had made little headway. There were one or two exceptions, however, and the most notable of these was that of Messrs. Dean Brothers, near Morgan. In this instance the seed was sown on March 25th on heavy loam, which had been ploughed and worked down just before seeding. The seed was rolled in and the ground was heavily irrigated immediately. Thence until June 3rd no rain fell, nor was the land irrigated. On that date, however, it was again irrigated, and rain occurred. After that the plot was in a swampy condition until August 20th, when the first cut, which stood 20in. high, was taken off. No manure was used. Professor Perkins mentioned that the plot at Roseworthy College (irrigated) had done well, and the third cut was now ready.

LIFE MEMBERS.

Mr. M. Manning (Carrieton) and Mr. M. Aitchison (Mundoora) were appointed life members of the Bureau in recognition of long and valuable service rendered to that institution and to the State.

FIVE NEW BRANCHES.

Approval was given to the formation of new Branches as shown—

Spalding.—Messrs. D. Wark, T. J. Preiss, J. Preiss, D. J. Campbell, S. Hennessy, M. Hennessy, D. J. McAskill, J. Pluckrose, W. Hacklin, E. E. Gill, P. A. Gill, M. McLeod, J. Shane, C. W. Smith, G. Thorn, S. N. Hallett, A. B. Jones, T. Walsh, D. A. Campbell.

Tintinara.—Messrs. J. E. Taylor, J. Wynes, R. J. Gully, C. P. Hodge, A. K. Wendt, J. Helling, A. Helling, R. K. Henderson, C. M. Ives, D. Bell, N. Bell, E. Northcott, G. Ives, — Stead, F. Stead, D. T. Kennedy, R. L. Scott, L. M. Scott, J. Donaldson, G. Bainger, — Bainger, M. F. Hodge.

North Booborowie.—Messrs. W. B. Ashby, A. V. Simpson, M. Canny, K. Phillips, F. L. Phillips, J. L. Farrelly, W. Banes, A. S. Toll, W. Toll, W. C. Catt, F. C. Catt, E. J. Morgan, W. E. Hannaford, E. J. Dunstan, J. W. Smart,

H. T. McQuillan, L. D. Clarke, T. Victory, W. C. Warner, W. Giles, C. J. Giles, G. E. Roberts, S. Mutton, J. Sullivan, W. F. McEvoy, P. McColive, T. H. Jeffery, G. E. Schaefer, F. C. M. Middleton, W. R. Birks, H. A. Mayfield, W. J. Cousins, H. A. Storr, M. Murphy, J. Murphy, P. Halls.

Glencoe.—Messrs. G. F. Ferguson, W. D. Mitchell, J. Dow, J. Halloway, W. Halloway, F. A. Telfer, M. D. Cameron, H. A. Cameron, W. Lehmann, P. S. Mitchell, W. Childs, jun., J. Riddoch, jun., A. Dow.

Mangalo.—Twelve members, whose names will appear in the next issue.

NEW MEMBERS.

The following gentlemen were approved as members of the Branches named :—Yallunda—W. Cabot, H. P. Cabot, J. Jones, S. L. Dix, A. Cabot, J. Winch, G. Gill, jun.; Hartley—F. Lehmann; Moonta—W. H. Bastian, R. C. Kitto, J. Andrewartha; Kalangadoo—J. Steele; Strathalbyn—E. Hall, M. G. Rankine; Keith—W. Graves, T. Packer, E. Aberlee, M. C. Redpath; Yongala Vale—J. Barker, G. Lloyd, C. Miller, D. Fowler, G. E. Edson, W. Campbell; Waikerie—C. Promnitz, W. Frahm, J. Jackmann, H. Aspinall; Gladstone—J. Slattery, R. Coe, F. Read; Riverton—Dr. R. McM. Glynn, O. H. Castine, D. Hannaford; Petina—W. Schultz, P. Barnes, A. Kenny, W. J. Lewis, A. J. Batt; Monarto South—H. E. Kuchel, J. Daly; Pinnaroo—L. Small; Warcowie—J. Marrow, G. Growden, E. Jarvis, F. Crossman, R. Bairstow; Port Broughton—D. Allchurch, E. Allchurch, H. H. Stephenson, G. H. Rantley, H. P. Whittaker; Nantawarra—R. D. Nicholls; Freeling—A. B. Anders; Blyth—J. B. Kirchner, F. A. Kirchner, A. B. Kirchner, M. G. Best, S. R. Neville, J. Williams, H. Neumann, H. A. Montgomery, J. Kostera, M. Vogt, A. Hamilton, D. Crawford, jun., J. F. Bishop; Pine Forest—H. Adams; Parilla Well—F. G. Webster, A. Webster, R. Noltenius; Arthurton—C. W. Bowden.



A USEFUL FIELD ROLLER.

THE AGRICULTURAL BUREAU.

TWENTY-FOURTH ANNUAL CONGRESS.

OPENED BY THE GOVERNOR.

The Twenty-fourth Annual Congress of the Agricultural Bureau was held at the Adelaide School of Mines and Industries on Monday, Tuesday, and Wednesday, September 9th, 10th, and 11th.

During the sittings the following delegates attended :—Amyton—J. J. Cormack, S. Thomas; Angaston—S. R. Smith, J. C. Jacob; Appila-Yarrowie—W. Francis, J. H. Bottrall; Arden Vale and Wyacca—P. A. Hannemann, R. Paynter; Arthurlton—J. Welch, W. R. Stephenson; Balaklava—T. A. Thomas; Belalie North—A. H. Warner, H. Waldhuter; Beetaloo Valley—P. Curtin, J. Ryan; Berri—W. R. Lewis; Blyth—A. L. McEwin, C. H. Zweck; Bute—W. H. Sharman, L. McCormack; Butler—D. B. Butler; Burra—F. G. Scholz, F. Duldig; Carrieton—M. Manning, J. Ormiston; Cherry Gardens—C. Ricks; Clare—F. W. H. Lee, D. Menzie; Clanfield—W. Queale, A. Richards; Clarendon—A. L. Morphet, A. Phelps; Coomeroo—E. Berryman, R. G. Polden; Coonalpyn—G. E. Venning, A. R. J. Gurner; Coorabie—H. V. Hobbs; Cradock—M. J. McAuley, A. Clarke; Crystal Brook—M. P. Pavy, W. W. Robinson; Davenport—A. Gosden, E. H. K. Messenger; Dawson—C. H. Meyers, H. L. Meyers; Dowlingville—G. Mason; Elbow Hill—J. Rehn, W. T. Cooper; Forster—J. G. Whitfield, J. Johns; Frances—S. Meehan, B. F. Feineler; Freeling—J. A. Kuhlmann, J. A. Mattiske, sen.; Gawler River—H. J. Dawkins, B. F. Hillier; Georgetown—S. Eyre, J. Freebairn; Geranium—W. J. Mitchell, A. R. Dohnt; Gladstone—R. E. Lines, W. Brayley; Greenock—V. Koschade, W. Roennfeldt; Green Patch—C. J. Whillas; Gumeracha—J. Monfries; Hartley—J. F. Tydeman, J. Stanton; Hawker—J. Smith, G. H. Wright; Hookina—P. Murphy; Hooper—J. R. Beck, C. B. R. Wright; Ironbank—C. J. Hill, C. Morgan; Kadina—G. A. Weidenbach, A. L. Speer; Kalangadoo—J. J. Guerin, E. Earle; Kanmantoo—E. Shepherd, T. Critchley; Keith—W. H. Morcombe, J. A. Lock; Kingston—R. Jackson; Kybybolite—E. C. H. Schinckel, A. Bradley, jun.; Lameroo—J. Cameron, E. J. Trowbridge;

Leighton—T. Goodridge, A. E. McWaters; Longwood—J. R. Coles; Lucindale—H. Langberg, L. McInnes; Lyndoch—J. Mitchell; MacGillivray—H. C. Williams; Maitland—E. G. Jarrett, C. Pitcher; Mallala—J. J. McCabe; Meadows—G. Ellis, J. Stone; Millicent—J. Bowering, J. J. Mullins; Miltalie—P. G. Wilson, C. E. Searle; Minlaton—B. Correll; Monarto South—G. Patterscn, G. J. Hartmann; Monteith—J. Rowan, R. G. Magor; Moorlands—A. Maczkowiack; Moonta—E. Nankivell, T. R. Luke; Morchard—W. A. Toop, W. Munro; Morgan—H. Wohling; Morphett Vale—A. C. Pocock, T. Anderson; Mount Barker—C. B. Pope, J. Cleggett, F. Simper; Mount Bryan—J. Tralaggan, H. L. Hatherly; Mount Bryan East—W. H. Quinn, T. Quinn; Mount Gambier—A. J. Wedd, D. A. Collins; Mount Remarkable—J. McIntosh, H. H. Davie; Mundoora—W. J. Shearer, F. Loveridge; Nantawarra—R. P. Uphill, T. Dixon; Naracoorte—A. Langeludecke, W. Loller; Narridy—J. Darley, J. J. Kelly; Narrung—J. Morgan; North Booborowie—W. B. Ashly, J. Dunstan; Northfield—W. J. Dall, D. Rowe; Orreroo—M. W. Forrester, A. L. Brice; Parilla Well—J. W. Johnston, L. G. Neville; Parrakie—M. J. Kildea, N. Good; Paskeville—W. G. Drewett, T. M. Forbes; Penola—J. F. Warner, S. Ockley; Petina—J. Howard; Pine Forest—D. Carman, R. D. Goodridge; Pinnaroo—H. Ledger, P. H. Jones; Port Elliot—J. Brown, W. E. Hargreaves; Port Germein—A. Carmichael, W. H. Stock; Port Pirie—D. L. McEwin, W. R. Wright; Quorn—A. F. Noll, C. Patten; Redhill—G. A. Button, F. A. Wheaton; Renmark—W. H. Waters; Riverton—H. A. Davis, E. A. Gray; Saddleworth—R. H. Townsend, J. H. Eckermann; Shannon—G. W. Proctor; Stockport—J. Murray; Strathalbyn—T. Collett, E. Hall; Tatiara—T. Stanton, T. L. Truman; Tintinara—E. B. Northcott; Utera Plains—A. Ramsey; Waikerie—F. G. Rogers, C. Borroughs; Warcowie—A. G. Telfer, J. Taylor; Wepowie—J. Chrystall, J. Crocker; Whyte-Yarcowie—F. Hunt, E. J. Pearce; Wirrabara—E. J. Stevens, A. R. Woodlands; Wilkawatt—J. Ivett, F. Gasmier; Willowie—D. McCallum, W. P. Foulis; Willunga—T. Pengilly; Wilmington—A. H. Noll; Wirrega—W. R. Fairweather, J. L. Bice; Woodside—R. P. Keddie, A. S. Hughes; Yabmana—J. N. McCallam; Yadnarie—B. B. Crosby; Yongala Vale—T. Keatley, J. Lloyd.

THE OPENING SESSION.

Congress was opened at 8 p.m. on September 9th by His Excellency the Governor (Sir Day Hoi Bosanquet). Mr. A. M. Dawkins (Chairman of the Advisory Board of Agriculture) presided, and among others present were the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), the Members and Secretary of the Advisory Board, and a large number of officers of the department, including the Director of Agriculture (Mr. Wm. Lowrie, M.A., B.Sc.), Professor Perkins (Principal Roseworthy College), and Professor Osborn (Vegetable Pathologist and Botanist).

The Chairman expressed the pleasure of those present at the presence of His Excellency, whom he asked to declare the Congress open.

ADDRESS BY THE GOVERNOR.

His Excellency said—"I esteem myself very highly honored by the invitation to open this Agricultural Bureau Congress of 1912, and I thank you all very heartily for the compliment which you have thus paid me. Let me first define my position. Mr. Dawkins, in the Chairman's speech last year said, 'The Agricultural Bureau is a means of bringing a body of men who are anxious to learn in touch and sympathy with those who are willing to teach.' Well, I am one of those who are anxious to learn, and, therefore, I will not detain you long with an opening speech, which might interfere with the opportunities of those who are willing to teach. At the same time I must congratulate the members of the Bureau upon the large numbers who are attending this Congress; there can be no doubt that the meeting together of those interested in the agricultural welfare of the country, to exchange ideas and experiences, to compare with each other the result of their labors, and to meet in friendly social intercourse is productive of immense benefit to themselves and to the people of the State. (Applause.) It is a mere truism to say that the wealth and prosperity of the State depends upon the result of the exertions of the agriculturist and pastoralist. The annual export value of the wheat and wool produced in South Australia is a measure not only of the well-being of the farmer and the pastoralist, not only of the prosperity of the railways, the tramways, the hotels, the racing clubs, the implement manufacturers, and motor car builders, but it is also a measure of the funds available for the prosecution of public works, and, therefore, it is a measure of the power of the Government to provide employment for those workmen who depend for their subsistence upon daily wages.

"A large proportion of the Government expenditure is justly based upon the construction of railways, by means of which greater wheat-bearing areas may be brought into cultivation, closer settlement may be largely extended, and the annual export of primary produce may be developed and expanded.

WHEAT PRODUCTION.

"Mr. D. J. Gordon, in an eloquent speech delivered at the Chamber of Manufactures, said, 'a determined effort should be made by South Australian farmers to force their grain production up to 30,000,000 bush.; it could be done. New South Wales had doubled its wheat production in ten years.' I cannot quote you all his speech, but everyone should read it. In conclusion he speaks of the evils of centralisation, and says, 'they should recognise, as Australians, the fundamental economic truth that it is the productive industries which really add to wealth, pay wages, and maintain a high standard of comfort.' These words should be written on the heart of every South

Australian. Gold mines are to be found in our wheat fields, and they are inexhaustible; but the price of wheat, it should always be remembered, is fixed by forces which exist outside the Commonwealth, and cannot be raised by any action of State or Commonwealth authority.

"I should only waste your time by attempting to describe the detailed progress of the Department of Agriculture. No doubt Professor Lowrie, your most able Director, will tell you all that is necessary; but I should like to mention the experimental farms at Loxton and Veitch's Well, because the experiments at those places and the lessons derived therefrom are of splendid advantage to the struggling agriculturist in his arduous battle with the difficulties of soil and climate elsewhere. At Loxton, standing in the wheat, which had been manured with 60lbs. to the acre of superphosphate, the ear reached well above my chin, and I have never seen finer or better filled out grain. At Veitch's Well the wheat was in splendid condition, and, although the experimental area was at that time unprotected by a vermin fence, the wheat showed little deterioration from the ravages of rabbits. In visiting Mount Gambier this year, I found that some of the farmers who had grumbled about the price of the land when they bought it, had gained more than double the fee simple in one year from potatoes or onions.

THE DAIRYING INDUSTRY.

"I would like to draw special attention to the dairying industry. Twenty-five years ago butter was made in a casual fashion in Australia for the local market; the position was changed as by magic by the coming of the cream separator and cold storage, and the dairying industry now yields the Commonwealth about £15,000,000 sterling per annum. The question is, does South Australia take her fair share in the participation of that profit. (Applause.) In the old days there was in Australia but one harvest. If the cereal crops failed the outlook was black. With the advent of the refrigerating appliances a brighter era began, and the dairying, frozen meat, and fruit trade arose, the planting of special grasses and fodder plants commenced, and great efforts were made, by importation of selected dairy cattle and crossbred sheep, to take the fullest advantage of the new trade which had arisen in butter and cheese and frozen meat. Does South Australia now take her fair proportion of the dairying trade? I have been at some trouble to get figures for 1911, and I make out that the yield of South Australian butter was valued at £424,000 sterling, of which £103,876 was exported, and that the value of cheese products was £37,000. The total production, therefore, of the dairying industry in South Australia, including the milk consumed as such, yielded during 1911. £631,000. The proportion of Australian butter exported is growing every year—in 1908 it was 55,700,000lbs. and in 1910 it was 87,928,000lbs. But taking the figures for South Australia only we find that the export of butter in 1910 was 10,717,486lbs. and in 1911 it was 9,691,666lbs., a decrease of

1,022,820lbs. The export of cheese in 1910 was 1,796,281lbs. and in 1911 it was 1,517,561lbs., or a decrease of 278,720lbs. on the figures for the previous year. Of course, those decreases were due to the dry season, and this year, I suppose, we must expect a further decrease. But that does not affect the question—Does South Australia take her fair share with the rest of the Commonwealth in the dairy trade? Dairying is a particular boon to the farmer, because it pays his cheque monthly. This prompt settlement must appeal with great force to men who are used to one crop a year, and at times not too sure of that. There is no fear of over production. (Applause.) The London market will take all the dairy produce you can send it at a considerably higher price than can be realised in Australia. For all those reasons I am giving for competition at the Show a cup for the champion dairy cow, and I earnestly urge farmers to consider the question of increasing the output of dairy produce in this State. (Applause.)

“ Before concluding I should like to say again that I consider this Bureau a most valuable institution ; it is a means of distributing and gaining information ; farmers, meeting together at the various Branches and discussing their experiences, learn from one another. There is also the human interest developed by meeting your friend at stated intervals, and cultivating your knowledge of his mind by conversation on subjects of intense mutual concern. I thank you once more for the compliment you have paid me.” (Applause.)

THE MINISTER'S SPEECH.

The Minister of Agriculture (Hon. T. Pascoe, M.L.C.), who was warmly applauded, said—

“ At this Congress we can fairly claim to have reached a higher level than has been the case hitherto. I am gratified to be able to say that the Bureau is stronger to-day than ever before. Interest has been sustained, not only in the general Congress at Adelaide, as is evidenced by the splendid attendance to-night, but in the district conferences, which are held under the auspices of the Branches situated at different parts of the State. The number of Branches is increasing, and has increased during the past year at the rate of about one per fortnight. The membership has now reached a total of about 3,000. These figures speak eloquently of the desire of the South Australian agriculturist to gain a greater knowledge of his occupation, and so become more expert as a tiller of the soil, and render better service to the State. It is very gratifying to notice the number of students who, on leaving the Roseworthy Agricultural College, connect themselves with a branch of the Bureau. Not only is this the case with the Agricultural College, but boys from Prince Alfred and St. Peter's Colleges who go on to the land are to be numbered amongst the Bureau membership. (Applause.) These young farmers have had educational advantages which the older men never received, and the result should surely be in the direction of better agricultural practices.

DISTRICT CONFERENCES.

"During the year district conferences have been held at Cherry Gardens, Kadina, Orroroo, Crystal Brook, Kingston, Cowell, and Lameroo. They were well attended, and it was a pleasure to be present and listen to the intelligent discussions on the problems connected with the cultivation of the soil. Various Branches in different parts of the State are conducting experimental plots for the purpose of ascertaining the most profitable wheat to grow, and the manurial requirements of the land.

KANGAROO ISLAND.

"Lately the department has laid out plots at Kangaroo Island, where there is a large area of ironstone country. It was found by the men who took up this land that it did not respond to their treatment. If success attends the trials of the Department of Agriculture on the Island the result will be to the benefit of the State as a whole. Shells from the Spit, on Kangaroo Island, have been applied to land deficient in lime, and the high percentage of that contained in the shells has made their application as an amendment to the land, a payable proposition. The shells are available to the general public at a price of about 8s. per ton at Port Adelaide. They should be well worth a trial in clay country. They are being used at Mount Compass and Kangaroo Island with good results. (Applause.)

VETERINARY LECTURES AND CLASSES.

"During the year a scheme of veterinary lectures and classes has been arranged. The department and myself have been surprised and gratified at the reception which the various Branches of the Bureau have given to this scheme. Out of 130 branches, 88 have agreed to form classes ranging from 20 to 40 members, in order that they may increase their knowledge regarding the common and simple ailments of stock, and thus, in such cases, be put in a position to treat them successfully. (Applause.)

ROSEWORTHY COLLEGE.

"Roseworthy College still holds its own as the foremost institution of its kind in Australia. (Applause.) Apart from its work as a college, its Principal (Professor Perkins) has been for a number of years conducting experiments in regard to wheat and fodders which will be of immense benefit to the farmers of South Australia. A man who, like Professor Perkins, conducts these experiments year after year, giving attention to the minutest detail, is, in my opinion, a benefactor of humanity. The value of his work will be better appreciated in a few years' time than it is to-day, as by then he will, as the outcome of continued experiments, be able to speak more confidently as to the results. Next year we hope to have a very much larger supply of seed wheat, true to type, for sale to farmers. The work of selection and raising

wheat true to type is proceeding at Parafield, Turretfield, Roseworthy, and in addition at Booborowie; and we hope to come much nearer than ever before to supplying the needs of agriculturists in different parts of the State. (Applause.)

NEW APPOINTMENTS.

“Two new appointments have recently been made, which we are hopeful will help us in our onward march towards perfection in agricultural science. Mr. J. Brown, B.Sc., has taken charge of Turretfield, where no doubt he will soon learn to apply the knowledge he undoubtedly possesses to local conditions. For a long time we have felt the need of someone to make investigations in regard to the various fungus diseases. The Agricultural Department recently combined with the University, with the result that Professor Osborn has been appointed Vegetable Pathologist and Botanist. His knowledge will be of service to the Agricultural Department in inquiring into diseases affecting our crops, and there is no doubt his work will prove of great interest and value to the State. We wish the two gentlemen I have mentioned every success in their new sphere of labor. (Applause.)

“The poultry industry is still in the hands of Mr. Laurie, an enthusiastic officer who spares no pains to make that industry a payable one in South Australia; and in this connection it is gratifying to know that the Roseworthy Poultry Station is the best of its kind south of the equator. In Mr. Quinn, the head of the Horticultural Department, we have also, as you all know, a most valuable officer. His Excellency evidently takes keen interest in the dairy industry. Although, perhaps, that industry has not progressed to the same extent in South Australia as it has in some of the other States, the reason is that, taking our State as a whole, the country is not so suitable as that in New South Wales, Victoria, and Queensland. Still, we are making progress, and I hope that by the settlement and full utilisation of reclaimed swamp lands along the valley of the Murray we will in the near future see a large increase in our dairy herds. Except there and in the South-East, South Australia does not possess the class of country necessary to enable the industry to progress to any great extent.

RAINFALL AND THE WHEAT YIELD.

“Lately I have been looking at the rainfall and other statistics, with the result that I have been struck by the progress which has been made in agriculture in South Australia. The figures are so interesting that I propose to have them printed in full.* I think a study of them will convince you that as a result of the lessons which we have learned in past years we farmers in South Australia will not be so adversely influenced by a bad season occurring now and again as we were formerly; further, that a bad season will not have the same effect as formerly on our prosperity, and through us the prosperity of the State. (Applause.) The figures I wish to quote from are records taken

at the Observatory of the rainfall for each year from 1880 to 1911, together with the average wheat yield for each of those years. They are as follows :—

Year.	Rainfall at Adelaide.	Wheat Produced.	Average Yield per Acre.
	Inches.	Bush.	Bush.
1880.....	22·240	8,606,510	4·58
1881.....	18·192	8,087,032	4·34
1882.....	15·702	7,356,117	4·13
1883.....	26·761	14,649,230	7·56
1884.....	18·738	14,621,755	7·32
1885.....	15·887	5,161,000*	3·16*
1886.....	14·420	10,835,000*	5·50*
1887.....	25·701	19·012 000*	9·75*
1888.....	14·547	6,187,000*	3·85*
1889.....	30·874	14,577,358	7·91
1890.....	25·779	9,399,389	5·62
Average for 11 years....	20·802	10,772,035	5·79
1891.....	14·005	6,436,488	4·15
1892.....	21·525	9,240,108	6·08
1893.....	21·485	13,618,062*	7·86*
1894.....	20·782	7,781,223*	4·93*
1895.....	21·277	5,929,300*	4·20*
1896.....	15·173	2,804,493	1·66
1897.....	15·424	4,014,852	2·64
1898.....	20·754	8,778,900	4·91
1899.....	18·844	3,453,135	4·64
1900.....	21·678	11,253,148	5·88
Average for 10 years....	19·094	7,830,970	4·69
1901.....	18·010	8,012,762	4·60
1902.....	16·019	6,354,912	3·64
1903.....	25·469	13,209,465	7·72
1904.....	20·311	12,023,172	6·53
1905.....	22·280	20,143,798	11·46
1906.....	26·513	17,466,501	10·36
1907.....	17·782	19,135,557	10·91
1908.....	24·561	19,397,672	11·45
1909.....	27·686	25,133,851	13·26
1910.....	24·618	24,344,740	11·57
1911.....	15·990	20,352,720	9·29
Average for 11 years....	21·749	16,870,468	9·16

* Estimate only. No production statistics collected.

SUMMARY.

		Average Rainfall.	Average Yield per Acre.
		Inches.	Bush.
1880 to 1890	11 years	20·802	5·79
1891 to 1900	10 years	19·094	4·69
1901 to 1911	11 years	21·749	9·16

“ One of the first things I noticed in looking at those figures was that while the rainfall at the Observatory in 1911 was only 15·990in. the average

wheat yield for the State was 9·29bush., or higher than for any other year prior to 1905—when we were just beginning to learn how to properly treat our soils—with one exception, in 1887, when we had an average return of 9·75bush.; but that year, instead of having only a 15-in. rainfall, we had a rainfall of 25·70in. Last year then, though we had one of the lowest rainfalls on record, our wheat average was higher than—with one exception—that of any year prior to 1905. To still further illustrate the progress we have made in agriculture let me call your attention to the average returns for the years in which the rainfall approximated that of 1911. In 1882 the rainfall was 15·702in., and the average yield 4·13bush.; in 1885 the rainfall recorded was 15·887in., and the average return 3·16bush.; in 1896—that is the year all of us who come from the North well remember—the rainfall was 15·173in., and the average yield only 1·66bush.; in 1897, with a rainfall of 15·424in., the average was 2·64bush.; and in 1902, with a rainfall of 16·019in., the average yield was 3·64bush. per acre.

THE GROWING PERIOD.

“No doubt some of you will want to know what about the rainfall in the growing period of the years I have mentioned. Well, I will give you the rainfall during the growing period, from May to November, of those years, and in that respect I think last year will take a lot of beating, particularly in the North. At the Observatory the position was to some extent saved by the September rains, but these did not reach very far inland.

The figures are:—

Rainfall at Adelaide Observatory from May to November inclusive.

	May.	June.	July.	August.	September.	October.	November.	Total for growing period.
	In.	In.	In.	In.	In.	In.	In.	In.
1880 ..	1·613	3·078	2·204	2·916	2·158	1·800	0·807	14·576
1881 ..	1·708	4·622	2·058	1·446	1·805	1·305	0·585	13·529
1882 ..	2·114	1·671	2·121	3·381	0·704	1·654	0·897	12·542
1883 ..	6·463	2·767	4·200	3·050	1·856	1·791	1·827	21·954
1884 ..	2·394	4·563	0·505	1·094	2·630	1·316	0·368	12·870
1885 ..	2·242	3·235	2·384	2·342	1·634	1·109	0·039	12·985
1886 ..	1·009	0·423	2·724	3·089	0·686	2·169	1·067	11·167
1887 ..	4·086	6·021	2·571	1·372	2·517	2·733	0·942	20·242
1888 ..	2·119	2·835	4·039	2·389	1·192	0·306	0·655	13·535
1889 ..	4·086	4·752	1·211	3·589	1·504	3·608	2·407	20·857
1890 ..	1·643	4·221	5·363	3·734	1·752	2·544	2·496	21·453

Average precipitation during above months for 11 years, 15·974in.

1891 ..	0·196	1·436	2·834	1·539	0·764	2·517	0·843	10·129
1892 ..	2·450	2·303	2·614	2·625	2·362	3·110	0·679	16·143
1893 ..	3·559	3·860	2·004	2·741	3·335	1·288	1·478	18·265
1894 ..	1·656	2·227	3·501	2·922	1·016	2·971	0·227	14·520
1895 ..	0·839	2·894	4·482	2·419	1·412	0·380	0·949	13·375
1896 ..	1·468	3·152	1·262	1·234	0·448	0·337	0·520	8·421
1897 ..	2·093	1·587	1·813	3·454	1·667	0·513	0·295	11·422
1898 ..	3·799	3·560	2·649	2·147	0·718	1·913	1·340	16·1·6
1899 ..	2·361	3·037	0·365	1·592	1·875	1·226	1·958	12·414
1900 ..	2·415	3·614	1·550	4·135	1·175	0·615	0·566	14·100

Average precipitation during above months for 10 years, 12·266in.

Rainfall at Adelaide Observatory from May to November inclusive—continued.

	May.	June.	July.	August.	September.	October.	November.	Total for growing period.
	In.	In.	In.	In.	In.	In.	In.	In.
1901 ..	1·177	4·910	2·069	1·186	1·484	1·588	0·874	12·118
1902 ..	1·070	3·877	1·414	1·131	1·643	1·767	0·559	11·461
1903 ..	1·702	3·866	3·470	2·312	2·849	0·661	2·566	17·466
1904 ..	3·009	3·921	2·733	1·984	0·694	2·109	0·651	15·092
1905 ..	3·578	3·709	3·324	1·451	1·507	2·898	0·151	16·648
1906 ..	2·118	5·175	2·870	3·971	3·366	1·659	2·449	22·608
1907 ..	2·404	2·340	2·811	1·805	1·081	1·708	1·480	13·629
1908 ..	3·867	5·416	1·212	2·345	2·895	3·590	0·347	19·672
1909 ..	4·020	2·246	3·605	5·586	2·193	2·168	2·763	22·475
1910 ..	4·410	3·037	4·048	1·713	2·809	1·796	1·316	19·129
1911 ..	1·89	2·52	1·97	0·76	3·80	0·55	0·39	11·880

Average precipitation during above months for 11 years, 16·560in.

“ Last year, as you will observe, in August 0·76 was registered, in September 3·80, in October (one of the vital months) 0·55, and in November 0·39. The total rainfall from May to November last year was only 11·880in. ; in 1882 it was 12·542in. ; 1885, nearly 13in. ; in 1897 it was 11·422in. ; and in 1902, 11·461, and yet with a rainfall of only 11in. during the growing period last year we raised the average yield for the State to 9·29bush. per acre. (Applause.) When you compare the figures, whatever credit you may give to artificial manures—and no doubt they deserve some credit—you must recognise that the more efficient working of the soil has made the artificial fertilisers useful and payable. (Applause.)

A FURTHER COMPARISON.

“ During the 11 years, from 1880 to 1890, the State produced 118,492,391bush. of wheat. During the next 10 years, from 1891 to 1900, the production was 78,309,709bush. South Australia has produced during the past 11 years 185,575,150bush., and it is a noteworthy fact that the yield of the last 11 years very nearly comes up to that of the previous 21 years. The increase is not due so much to the larger area cropped as to the fact that we are farming much better. The average rainfall for the first term was 20·8in., and the average yield 5·79bush. The rainfall during the second term averaged 19in., and the yield 4·6bush. However, in the case of the past 11 years the average fall of rain was 21·75, but the yield was up to an average of 9·16bush. per acre. And despite some bad seasons, taking the last seven years, it will be found that the average yield was 11·18bush. to the acre. It is quite likely that we will, within the next 10 years, reach the 40 million mark for an average season in South Australia. I wish you every success, both in connection with the Conference and during the season now approaching. I trust that we shall all learn those lessons which will go toward making us better agriculturists.” (Applause.)

THE CHAIRMAN.

The Chairman of the Advisory Board (Mr. A. M. Dawkins) said—

“ I am exceedingly pleased that His Excellency has seen fit to give his encouragement to the producing interests by opening the Congress. We have hardly realised the value of the part which the Bureau is playing in connection with the development of agricultural industries. In the sparsely settled districts it brings the neighbors together in a social manner, and many men have first learnt to express their views in public at the meetings of the Agricultural Bureau. The institution affords a means for the farmer to watch over his interests, and prevent the spread of noxious weeds and disease amongst stock, the qualities of which would perhaps be generally unknown but for the discussions taking place at the meetings. It affords a very excellent means for the expert to disseminate information amongst the tillers of the soil.

AGRICULTURAL EXPERTS.

“ The staff of the Agricultural Department is one of which we should be proud. The influence which has been exercised by Professor Lowrie on the agricultural practices of the State is hard to estimate. The increasing activity in the Agricultural Bureau shows that farmers are realising the value of scientific knowledge, and that they are anxious to secure information. The presence of the Bureau enables the experts to, as it were, feel the pulse of the farmer, and so ascertain the lessons which they desire to learn. With the experts on the one hand, and the members of the Branches on the other, an excellent combination of science and practical work is obtained. The man on the land is also learning of improved methods of cultivation and treatment of crops, and means of increasing the yields. Excellent work in this regard is being done by Professor Perkins at Roseworthy. During the last few years land values have been inflated; farmers must increase the production from the land, and see that it is worked to its best possible advantage, and Professor Perkins' investigations will go a long way to assist in finding the solution of the problem. I am very pleased indeed to know that the Minister has put the scheme for veterinary classes and lectures in operation, and I know that you are anxious to benefit through the scheme.

TRAINING AT ROSEWORTHY.

“ No one can listen to our veterinary experts giving a lecture without observing the eagerness of the farmers to gain information how to treat their stock. I have been surprised, while you manifest such a keen desire to learn from the Director of Agriculture, Professor Perkins, our veterinaries, Mr. Quinn, and other experts, all that they can teach you, that so few of you send your sons to Roseworthy College. If an occasional address from any of our experts is of so much value to you, how much more valuable to your sons would be the course of lectures on various subjects given at Roseworthy

College. If you personally feel the need of more knowledge on matters pertaining to the farm, is not there a need for it as regards your sons also? Increased knowledge concerning the work one is engaged in makes life better and more interesting, and I would strongly advise you, if you can possibly manage it, to send your sons to Roseworthy, where they will get a training which will fit them to become excellent farmers. The value of such a training is noticeable as regards the work of the Branches of the Bureau. I can, on reading the reports of the meetings of the Branches, pick out those which have as a member an old Roseworthy boy. I hope that this Congress will be most successful and that it will be a benefit to all." (Applause.)

Votes of thanks to His Excellency, the Minister, and the Chairman concluded the session.

TUESDAY, SEPTEMBER 10.

MORNING SESSION.

The Congress resumed its sittings on Tuesday morning. Mr. A. M. Dawkins (Chairman of the Advisory Board) presided over another large attendance.

THE BREEDING OF LAMBS FOR MARKET AND THE INCREASE OF FEED ON THE FARM.

Mr. Frank Phillips (Riverton Branch) read the following paper on "The Breeding of Lambs for Market and the Increase of Feed on the Farm":—

This question is so large and important to the South Australian farmer, and more especially to what we understand as inside country, that I shall only attempt to discuss it in view of the conditions pertaining in the district of Riverton, or similar country and climate. Let the farmer first decide on the class of sheep most suited for the work. I will not try to lay down any hard and fast rule, in favor of any particular breed, having only had experience with the large-framed station-bred Merino ewe, which is well adapted to our local conditions owing to its hardy constitution and power to withstand adverse weather. Cross this breed with the Shropshire ram, and we get a lamb which recovers more quickly from a check than the majority of other cross-breeds. In some cases this ram is found to be a very slow worker. During the winter he puts on a lot of condition, and when turned in with the flock, does not work at once. For the last three years I have always made it a practice to keep my rams in the sheep yards for about two weeks before they are required, and during that time supply them with very little feed, to work off some of the condition. When they are turned in with the flock they keep with the ewes better and do not wander away. In spite of this

precaution I have found them leaving the ewes. To make sure the percentage of lambs will be even and good, I have therefore erected a small yard in the paddock the sheep are grazing in, made of 3ft. pig-netting and a few iron posts, and by yarding the flock three or four nights a week for about two weeks I find the rams stay with the ewes and work better. Three years ago, by following this practice, from a flock of 224 ewes I tailed 208 lambs, none of them more than three or four weeks old; and three weeks later tailed 10 more, making a total of 218 lambs. I mention these figures to show that the Shropshire ram will work well if handled properly. I used three rams that season.

Some people consider that an even drop is harder to carry than a flock which is lambing for some time, and the lambs being sold off as they become fat; but as our season for fattening is not very long, I think the even drop is better to get the lambs off in one line. Should the local market not suit the farmer, he can make up a truckload and sell in the Adelaide market. Further, a farmer may, early in the season, intend to fatten the lambs himself, but later on he finds he is short of feed, and wants to sell. If the drop is nice and even the sale will generally be an easy and satisfactory one. Another point to add to the appearance of the flock and encourage the growth of the lambs, and which is not much practised in this district, is britching or crutching the ewes, *i.e.*, shearing away the wool from below the tail and a little way down the hind legs. This keeps the hind quarters of the ewe clean in case of scouring, and reduces the risk of being troubled by the blowfly at lambing time. This work should be done not later than six weeks before lambing. Great care should be exercised in this work to avoid knocking and crushing the sheep in the yards. The right time for lambing is controlled by many conditions. I think the object of the lamb-breeder in this district should be to lamb at the latter end of April and early May, to get the lambs away in September and early October. Shear the ewes as soon as possible, to miss the grass seeds, and have the sheep ready to put on to the fallow land.

My remarks as to the time of lambing only refer to an average season when, in this district, we have green pickings in April, and fair feed in May, and other feed after that; but the lambing in a season like the past I would not attempt to discuss.

Sheep must be kept where wheat is grown, as they save a lot of work for the team by cleaning up the fallow lands. It is not wise to put woolly sheep on fallow, as that tends to reduce the value of the wool at once.

METHODS OF INCREASING THE FEED ON THE FARM.

To consider a season like the present, when a good paddock of feed is hard to find, we should look back a few months to, say, February. Most of the harvest work is then done, the horses are doing nothing, and the stock have had the best of the feed out of the stubble lands. In March we find

the farmer burning off most of the straw, and then he sits back and waits for early rains to bring up early feed for his stock and for his ewes to lamb on. During harvest there is always a certain amount of grain lost, not altogether due to the use of the harvester, but to the variety of wheats sown, which, when nearly ripe, shell out during a high wind. What becomes of this wheat? We notice it on the land soon after the straw is burnt off, and one naturally thinks there will be good feed for the stock, but nine times out of ten it does not come up to expectations. The fault lies chiefly with the farmer and not so much with lack of early seasons. Take an example—A farmer has 300 acres of stubble land which he intends to fallow up during the winter. He should cut straw on half the area with the binder, or break it down, rake it up clean, and stack in the paddock for shelter for the stock. While stacking sprinkle molasses mixed half and half with water over the straw. This makes a feed that horses and cattle will eat readily in the winter months. He should start the cultivator to work on the stubble land that has been cleaned of the straw to insure a better germination of weeds, &c. He can then let the other 150 acres stand with the straw, as a safeguard in a season like the present one. This would still help to keep his stock in condition until the rain came. After the first rains there are generally a few warm and drying days in which the straw can be burnt off fairly well, and knowing that he will soon have fair feed on the balance of the stubble land the farmer can then start fallowing, directly after seeding, the land which had the straw burnt off; and should this land become too hard to plough in a dry season he can turn his attention to that which was cultivated, and which should be easy to work because the early rains have not been allowed to run away. I have found that land treated in this way when ploughed in the winter always works beautifully. It does not turn up in lumps.

A good burn tends to keep the land free from weeds, &c., but why burn all the seeds every year? Why not work the fire stick in rotation, one half burnt off this year and the latter half worked as described? Red land is always clean after a burn, and very little feed comes with the early rains. Black and loose land cracks in the summer and allows the seeds of wheat and weeds to get out of the range of the fire, and thus we find more rubbish on looser lands. In this case I do not think it so necessary for the straw to be carted off, but burn and work as mentioned before.

Sowing crops for feed does not receive the attention the importance of the subject warrants in this district. If barley were sown on a portion of our stubble lands early in the year we could get a large amount of feed before the end of August, and then work the land as bare fallow. I have sown barley early on fallow and fed heavily, and then reaped a good crop. One year on 10 acres barley I fed 200 ewes with 180 lambs until the second week in September, and then reaped six large bags per acre. I brought the sheep on once every fortnight and fed for one week. In another season I fed 14

acres barley until September and reaped 18bush. per acre. In both instances this, together with the other feed on the farm, allowed me to fatten the lambs for market ; otherwise I should have had to sell them.

On another occasion I carried nine Shropshire rams from May 20th to the middle of October on one acre of barley, half an acre of natural grass, and with no water, and then they were too fat to work. Needless to say I did not look for a crop.

Instead of burning off barley or oaten straw it is wise to cut and stack it. If done directly after reaping and made into large stooks it will be sweeter and not so dry, also retaining a fair amount of color. This chaffed with hay and mixed with molasses makes a good feed for stock in a season like the present one.

Peas sown for feed is another good crop, and is coming more into use. There is no doubt that this crop helps to prevent takeall. Its feeding value is high, and the crop comes in for use when the other feeds on the farm are scarce. It can be fed in the green stage or when dry. I prefer to feed it dry. In one season I carried 400 odd sheep on 42 acres of peas during January, February, and March. There was a running creek in the paddock. I sold the sheep as fats.

Some people think that to erect fences for cropping small portions of the farm with fodder crops is too expensive. It is well-known that the smaller the paddocks on a farm the more stock it can carry ; but fencing is dear work at any time. My practice when putting 10 or 20 acres to barley or peas for feed is to run up a light fence made of 3ft. pig netting and iron posts, securing the netting to the posts with binder twine saved from the chaffcutter. It is quickly put up and removed to other parts of the farm, and if carefully handled the material will last a long time.

The figures I have mentioned have all been gained from my personal experience, and I think my neighbors will bear out the statements made in this paper, especially the latter portion. The whole question is one which must engage the attention of many farmers in the Lower North. We must make more use of stock on our farms, or I feel sure our crops must suffer in the long run.

THE DISCUSSION.

Mr. J. R. Beck (Hooper) said that Mr. Phillips had expressed the opinion that it was not wise to put woolly sheep on fallow. He had, a few weeks ago, read an article in which the writer said that he had got a higher price for the wool from sheep which had been run on the fallow.

Mr. S. Eyre (Georgetown) confirmed the remarks in the paper as to the damage done to the wool by putting sheep on fallow. His Branch had conducted a co-operative shearing depot, and had gone to the expense of engaging a classer for two years out of the three the depot was run. He could assure those present that the classer could tell at a glance whether the sheep had been

run on fallow or not. There was, however, a certain amount of advantage gained by keeping sheep on fallow, because if they got a less price for the wool they received benefit by the good the sheep did the fallow. He thought there was useful information contained in the paper.

Mr. Blesing (Port Germein) did not indorse the opinion of Mr. Eyre as to the deterioration of wool on sheep run on fallow. If they inquired closely they would find that the reason why the sheep took up dirt was because they were run on fallow directly after they were shorn, and they carried that dirt till the next shearing. During the last two years he had had his sheep running for about a month on fallow ground and they had kept the weeds from going to seed, and he got one penny per pound more for the wool than had his neighbors. Even if anyone got a little less there was so much more weight in the wool that it paid to let the sheep on fallow. (Laughter.) That was his experience, and he had been in the wool business for the last 30 or 40 years. He agreed with the writer of the paper as regarded the burning off of stubble. If people had kept their stubble this year they would not have lost half the stock they had.

Mr. D. McCallum (Willowie) said that sheep run on fallow grew more wool, although the wool was not worth so much per pound.

Mr. F. A. Wheaton (Redhill) asked if putting molasses and water on the straw would not tend to make it rot.

Mr. Phillips (Riverton) said it would not, providing common sense was used. The straw soon got dry, and in fact, if the molasses was put on one load when stacked it would be dry before the next load was ready.

Mr. H. J. Dawkins (Gawler River) had stacked straw when it was raining, but it had not deteriorated. He thought the paper very practical, and congratulated the writer. Mr. Phillips had said that he fed the rams well all the year round, and then about two weeks before he put them to the ewes shut them up in the yards to take off their fat. His practice had been somewhat the reverse. He kept the rams on poor feed until about three weeks before putting them with the ewes, and then put them on good feed so that they might get in good heart. He had always had a good percentage of lambs. Crutching was very essential. Stacking the straw was useful, and horses, even at this time of the year, would eat it readily. The question of humus came in, and Professor Lowrie would tell them that it was unwise to burn off except as a precaution against "takeall."

Mr. F. M. P. Pavy (Crystal Brook) thought the paper very good, especially the part dealing with breeding and feeding. It was useless to breed well unless they fed well, and the matter of increasing the feed on the farm was, therefore, very important.

Mr. A. J. McEwin (Blyth) said the only advantage he found from stacking straw was that it made a good shelter. He had stacked straw for a good many years, and last year was the only time he had found it of any use.

He never gave his horses straw, but stacked plenty of hay for them. He believed in stocking up to the full capacity. He had 3,000 acres. He cropped 1,000, had 1,000 in fallow, and carried 2,000 sheep. He had had a bit of a scare this year, but nevertheless had come out trumps. They should aim at increasing the feed on the farm. He had sown oats in stubble land—not on fallow—early in the year, and if they did so and kept the sheep off it for a few weeks they would have something to tide them over afterwards. The dry seasons were in a minority. Last season was a dry one and they had felt the pinch this year, but it was only a matter of a couple of months—April and May. If they stacked a small quantity of hay and sowed oats on the stubble, letting it have a little growth before putting the sheep on it, they would only have to feed them a short time. It was a good many years since Professor Lowrie had told them that if they increased the quantity of manure they applied to the land they would not only get a better return but increase its carrying capacity afterwards. He could confirm the Professor's statement. He had used 1cwt. of manure to the acre and people had thought he had gone cranky, but one season he had reaped an average of 33½ bush. As he had said before, straw was a fine thing for shelter for stock, but he did not believe in its feeding qualities. He had tried it 14 or 15 years ago and had thereby killed half a dozen horses, so had never tried it since.

Mr. F. Gasmier (Wilkawatt) said that the writer of the paper had referred to planting barley for feed. He thought it would be better to sow peas, as by doing so they would not only get the feed, but also enrich the soil. Peas were excellent fodder for both sheep and stock. He had found the stacking of straw very useful. He had seen cattle eat it heartily for hours. (A voice—"They did not die?") They had not.

Mr. T. Pengilley (Willunga) said he could testify as to the benefit of growing peas. He had on his farm about 6 acres, which for a number of years, though the land was cultivated well each year, would not grow wheat. Some three years ago he sowed it with peas and the following year it was put into crop, with the result that the crop came so heavy that it laid down. If it had stood up he would have had 4 tons to the acre from it.

The Director of Agriculture (Mr. W. Lowrie, M.A., B.Sc.) said he could confirm what Mr. Phillips had remarked in regard to the value of a pea crop, whether grown for grain or to be fed down, as means of lessening the risk of "takeall." He had received letters from men in the State to that effect. It was first brought under his notice by the experience of some farmers at Gumeracha. They grew wheat, and wheat only, until at last there came a time when their crops were very unsatisfactory. Then, however, they grew peas on their land, with the result that they afterwards could grow wheat as satisfactorily as they had in the early stages. The explanation there was not entirely that the growing of the peas reduced the risk of takeall, but the fact was that in those wetter districts the crops were

suffering from nitrogen starvation, and they were calling it takeall. The writer of the paper had done well to bring forward the subject, as it seemed to him that during the last few years the value of keeping sheep on the farm had not been fully appreciated. He felt sure that the farmers must keep more stock on their farms or otherwise the crops would suffer in the long run. (Applause.) The output of export lambs was not much better than it was 12 years ago, and that was to be deplored. There were some things in the paper which he did not altogether agree with. Mr. Phillips had advised crossing Merino ewes with Shropshire rams. It would certainly be more profitable to use half-bred than Merino ewes, and the crossing of the short-woolled ram with the Merino ewes had been found a mistake in all the States, as well as in New Zealand. If they had Merino ewes and mated them with short-woolled rams they might get a higher percentage of lambs than if they used other breeds of rams, but there would be a certain percentage of the lambs which would have to be held over, and these once checked were hard to get going again. His experience in New Zealand had satisfied him that the practice which obtained very largely amongst the farmers there of using long-woolled rams with Merinos was much to be preferred to the practice of using short-woolled rams. On the other hand if long-woolled rams were used he preferred the English Leicester. They could then start with large-framed Merino ewes, use English Leicester rams, and keep back the best of the ewe lambs for their flock. These half-bred ewes could then be put with either the Shropshire, Southdown, or Dorset Horn rams, with the result that the ensuing lambs would be nicer in the carcass, and the meat would be of a color that the English market was accustomed to. That unfavorable appearance of Austral'an lamb in London was due to the large proportion of the Merino in it. If they could get more of the English breeds into the lambs they were exporting he was satisfied they would get better prices. He was sure that by adopting the course he had suggested they could get lambs as fat and of as good quality as they did at Canterbury. If farming land his aim would be to start with good large-framed Merino ewes and to use a long-woolled ram, and to keep the best of the ewe lambs for his flock. The Leicester-Merino ewes made good mothers, and he believed a man who looked after his sheep properly would get from them a percentage of 130 to 140 more easily than he could get a 90 percentage from Merinos. By following on the lines he had stated they would get ewes that would give them a good percentage, get lambs of a bigger weight at 5 or 6 months old, and the color of their meat would be more saleable in London. By using a Southdown ram with the half-bred ewes they would get lambs of a better carcass than if Shropshire rams were used, but they would take a fortnight longer to come to the same weight. All farmers, he contended, should keep a flock of sheep, and if they did so he urged them to proceed on the course he had outlined. On the

matter of saving straw he thought it well to husband the straw from time to time. He had not had any experience in using molasses and water, but would prefer adding salt to straw intended for feeding purposes. (Applause.) When feed was soft and watery the stock would benefit by having straw to eat.

Mr. Phillips, in reply, said he had written his paper from the point of view of the man who cropped half his land each year. The price of land in the Lower North was too high for them to afford to let it lie idle, and his idea was that they should get something out of it in the way of feed for cattle, sheep, or horses. He thanked members for the way in which they had discussed his paper. It was by setting down their experiences and discussing them that they benefited, and in that direction he could testify that the value of the Agricultural Bureau was highly appreciated by farmers. Personally, it had saved him hundreds of pounds.

THE MOST SUITABLE CLASS OF FARM HORSE FOR THE STATE.

Mr. W. P. Foulis (Willowlie) read the following paper on "The Most Suitable Class of Farm Horse for the State":—

In travelling through the State one is struck with the want of uniformity in our farm horses. There are only a few farms where a uniform type of high-class animal is kept. Clumsy, over-grown draughts are seen working alongside of lighter mongrels. A really good team is frequently spoiled by the inclusion of an overgrown or stunted mongrel.

In defining the most suitable class of horse for the State one must take into consideration all the conditions. In many of our far-northern districts, and in the loose mallee country, the work is comparatively light, whilst in some of our more southerly districts, where there is heavy clay, the work is sometimes on the heavy side. The climate of the whole State is a changeable one, and is subject to more or less droughty conditions. To meet these conditions a horse must be of a moderately heavy stamp, of a strong, robust constitution, and a good doer. One of the chief qualifications required in a farm horse is that he shall be a fast walker, otherwise he cannot be considered a suitable animal, even if in other respects he is all that could be desired.

Before dealing with any particular breed, I will state a few characteristics to be looked for, namely:—Compact build, round barrel well ribbed up, short back, good sloping shoulder, square quarters, wide and strong across the loins, broad deep chest, moderate to short leg with clean strong joints, plenty of well-developed strong-shapely muscle and moderate-size flat bone. I favor the medium draught. Not the class usually termed medium in the saleyard, for these are really light draughts, but something a little smaller than those used for heavy dray work. To give a better idea, let me quote some measurements taken from two horses of good type. The first animal is a

four-year-old compact filly, with square quarters, carrying medium quantity of hair, suitable for work on the lighter lands. The measurements are as follows :—Height, 15½ hands ; girth, 6ft. 5in. ; forearm, 23in. ; forecannon, 9in. The other is a matured horse, capable of doing the heaviest farm work required. His measurements are—Height, 16 hands ; girth, 6ft. 9in. ; forearm, 23in. ; cannon, 10in. I favor this class for many reasons. They are good travellers. In nine cases out of 10 anything heavier than this will be found in the body of a team. It is easier to breed them true to type, or to the standard I have set, than the heavier draught. The majority of heavy draughts are loosely built, and have a tendency to slab sides and long back. They are not such fast movers, their own weight often being a hindrance. They are not nearly so healthy, and cannot stand the strain of fast travelling so well. In a time of drought the medium draughts will be found more profitable, as they require less feed to keep them in condition.

Some farmers urge that it is more profitable to keep the very heavy stamp of mares, as a more saleable foal is reared. Up to three years of age the foal from the medium mare will hold its own ; after that the one from the heavier mare will probably have the advantage, but the price obtained for the foal is not the only consideration. After careful observation of brood mares I have come to the conclusion that the medium mare will travel faster than the heavy mare whilst carrying the foal. She will work nearer to the time of foaling, and will do more work whilst suckling the foal.

To breed foals for sale, mate the medium mares with a heavy stallion. A good foal is thus obtained, and one class of mare answers for all purposes.

In breeding for farm purposes, observe the characteristics I have mentioned, and if any are lacking in the mares see that they are strong points in the horse. To breed an ideal farm horse, both sire and dam should have good square quarters, round barrel, be well ribbed up, and have a fast, free action when moving. I consider there is not enough attention paid to the action of stud horses. Many farmers breed from their slow mares because they are the best in other respects, whilst they possess other mares that are almost as good, and are splendid walkers—from which a more serviceable foal may be obtained. In my opinion, in the show ring judges do not pay enough attention to the movements and action of draught stallions. The grooms should come into the ring mounted, and be made to trot their charges long distances at full trot. Stallions would not then come into the ring looking like whales, and we would have a better opportunity of judging their qualities.

To get a uniform class of horse we must breed a distinct breed, and not a cross.

Of the various known breeds I favor the Clydesdale. They are active, strong, are usually staunch, thrive well, are docile, and exceedingly

tractable and intelligent. The Clydesdale is an exceedingly handsome animal, and a good team of them is a possession to be proud of.

The great difficulty the average farmer has to face in breeding high-class stock is to get the service of a sound reliable stallion. He is not in the position to purchase one for himself. He has learned from bitter experience that it does not pay to patronise the travelling horse that is serving far too many mares. After having paid from £3 to £4 each for a few mares without getting any foals, he becomes tired of this, and purchases a stallion for himself. It is usually one of very inferior quality, but he finds that it pays him better than getting the services of a travelling horse.

It is rather hard to find a solution for the difficulty. If farmers could only agree, the scheme for horse-breeding societies submitted last year by Professor Lowrie would be a good one, and well worthy of at least a trial. With the help of the Government subsidy, this scheme would be a good thing for both the owner of the stallion and the breeder. In the event of the horse having a bad season some of the nomination fee could be refunded to those whose mares missed, and if the horse should sire a high percentage of foals, and the funds of the society become exhausted the deficiency could be made up from the subsidy fund. The great difficulty would be to get farmers to agree about the horse. Under this scheme there would be a guarantee that the horse would only serve a limited number of mares, and the services of a high-class horse could be obtained at a reasonable figure.

I think it would also be a good idea if, instead of each farmer keeping a stallion of his own, several co-operated and procured a really good one for their own use only. Arrangements could be agreed on for his keep. There are far too many stallions of an inferior class in the State; but under our present mode of working this seems unavoidable.

THE DISCUSSION.

Mr. D. Rowe (Northfield) said that he had been told that horses for heavy pulling required good hocks, as it was there the strain was felt.

Mr. E. J. Pearce (Whyte-Yarcowie) thought the present method of judging horses at shows was a very rough and ready one. It would be a great advantage if the stock were judged by points.

Mr. D. McCallum (Willowie) agreed with the writer of the paper that for farm purposes more work could be got out of a medium draught horse than could out of those great clumsy things with long hair on their legs, who, if working on wet ground carried large clods of it along with them. (Laughter).

Mr. J. R. Beck (Hooper) said his experience was that the medium draught did more work than the heavy draught. The question was how to make the

services of suitable stallions available to farmers. He thought the introduction of the premium system, as in vogue in New South Wales, would achieve that object.

Mr. J. F. McEachran, M.R.C.V.S. (Government Veterinary Surgeon) congratulated the writer of the paper. The main feature in connection with horse-breeding was uniformity of type, and, unfortunately, that did not prevail in South Australia. Before they could get uniformity of type, stud books would have to be instituted. Whether the stud books should be divided into two classes—Shires and Clydesdales—was a matter for members of the Bureau to consider. If Professor Lowrie's scheme were adopted they would get a better type of horses and improve horse-breeding generally.

Mr. McEwin (Blyth) hardly agreed that only on a few farms was there to be found a uniform type of horse. He thought the farmers of South Australia had a real good type of horse, but that it could be improved was beyond question. What horses in South Australia did the hardest work? It was the mongrel every time. He favored Professor Lowrie's scheme if it could be worked. During the last year or two, however, plenty of good stallions had been available. The writer of the paper advocated a medium draught, but the measurements he had given were those of a tip-top Clydesdale. If they measured the horses in their stables he questioned if one would be found of 7ft. girth. With the exception of show horses they would find few Clydesdale entires that would measure 7ft. in girth. The paper, however, was a thoughtful one, and he agreed with the writer in his main points.

REGISTRATION OF STALLIONS.

Mr. V. Koschade (Greenock) moved—"That this Congress recommends the Government to make provision for the compulsory registration and examination of all stallions permitted to travel for hire or service, and that a limited number only be permitted to travel in a specified area, according to the requirements of the district." If they could bring a class of horses into this State suitable, not only for farm work but also for export, it would be of great advantage. There was a great demand in India for horses of a good type. At present in some districts they had horses altogether too heavy for farm work.

Mr. W. Roenfeldt (Greenock) seconded the motion.

Mr. D. B. Butler (Butler) said a provision that only a limited number of stallions could travel a given area would press very hard on new districts like Eyre's Peninsula. His own district (Tumby Bay) had been travelled by a few first-class stallions, but the high fee prevented the farmers from utilising them. Now nearly every one of the farmers had his own stallion. He had bred horses all his life, and he had found that there was more in feeding than in

breeding. If a colt was fed well it would turn out a first-class horse. His experience was that the thoroughbred died first when any difficulties came along. At the same time he was glad to see that the first-class thoroughbred draught was being introduced. It would, however, be a serious mistake to do away with what they called the mongrel and compel people to pay a fee of £4 or £6 for the service of a first-class horse. (Applause.)

Mr. A. Gosden (Davenport) supported the motion. In his district they had to accept what stallions came along, and it was impossible to get a good team right through.

Mr. J. Smith (Hawker) asked if the resolution meant that no man could keep a stallion unless it was registered.

Mr. Koschade—"No; not unless they travel for a fee."

Mr. Smith said in that case he was entirely in accord with the motion. He thought in his district they had all the stallions that had been rejected. (Laughter.)

Mr. McCormack (Bute) said registration would practically be useless unless the veterinaries were given more power. At present if a horse was sound, no matter how much of a weed he was, he could pass the test and be registered, while on the other hand some of the finest horses in the State were rejected.

Mr. McCallum (Willowie) thought the resolution unworkable. If all the horses used for breeding purposes had to be examined by a veterinary, how much would it cost? A strange thing in his district was that horses condemned by the veterinaries were the best horses there.

Mr. McEachran said the examination of stallions had been instituted in Victoria in 1907, and they also included type and conformation. When the examinations were commenced here some stallions not of good type and conformation were passed, but now they not only rejected horses for unsoundness but also if they were not of good type and conformation. The matter of compulsory registration of stallions should receive careful attention. It was no use talking about uniformity of breed or type unless they could get rid of the many unsound stallions which travelled through various parts of South Australia. To achieve their object, however, there must be a uniform Licensing Bill throughout the Commonwealth. But before that could be brought about it would be necessary that the veterinary authorities in the different States should confer, so that they might come to a uniform decision. He failed to see how they could limit the number of horses travelling in any district, and suggested that the part of the resolution dealing with that matter should be excised, and that Congress should instead affirm the desirability of a uniform Licensing Bill being passed in all the States.

Mr. Koschade said the practice he advocated had been adopted in other places.

In answer to a question, Mr. McEachran stated that of 509 stallions examined, 115 had been rejected.

Mr. Beck (Hooper) suggested that the question should be referred to the Branches for their consideration.

Mr. McCormack (Bute) moved as an amendment—"That this Congress favors the compulsory registration of stallions, and also a uniform Stallion Licensing Bill throughout the Commonwealth, the registration not to take effect until 1915, and the matter to be referred to the Branches within four months."

The amendment was seconded, and carried by a large majority.

ONION-GROWING.

Mr. F. Simper (Mount Barker) read the following paper on "Onion-Growing":—

The onion is one of the oldest vegetables known. It is gaining favor year by year; therefore, it is necessary to increase the production to meet the demand. With a certain amount of knowledge and labor there are times when fair profits can be made by growing onions. In a district such as ours, where many of the holdings are small and the land expensive, it is necessary to combine agriculture with gardening by growing root crops. From the outset, I wish it to be strictly understood that these remarks on onion culture are intended only for this district or one of similar soil and climate. Should I describe the best methods for Mount Gambier and parts of Victoria, where the soil and climate are so suited for onion-growing over large areas with less expense than here, I am afraid that many would be misled. Onions can be profitably grown in this locality, and harvested at a time when the markets are bare of a good export variety, if sufficient care is taken to select patches of soil that are suitable for raising heavy crops of good quality. With a fair summer, onions from this neighborhood can be harvested in February or before the bulk of the Gambiers and Victorians are ready. The soil most suited for this plant is a loose, deep, dark-colored loam, which must be fairly well drained. Onions will grow almost anywhere in this district; but if top prices are desired they must be of quality. The results of onion culture on unsuitable land are too well known and far too risky to be recommended. If possible, select a patch of land that is open, giving all trees, hedges, &c., a fairly wide berth; and should it be at the foot of a hill, see that it is kept well drained in the winter; and also note that the ground must be kept free from weeds. Give the land a good dressing of yard manure at the end of the summer, or as soon as the former crop, whatever it may be, is taken off. After the early rain plough as deeply as possible, then harrow it well. If very lumpy put a soil grinder or roller over it; it can then be left until planting time, when, to improve the crop, an application of bone-super. at the rate of from 3cwts. to 5cwts. per acre should be applied. Onions have grown well on the same land several years following with the aid of manures; but a change of crop is necessary to

obtain the best results. I would recommend late garden peas or potatoes for a change. There are many varieties of onions to choose from. I have found the Brown Globe most suitable here, as it comes to maturity between the early sorts, which will not keep long, and the late kinds that are rather delicate for our climate. Select the best bulbs from the last crop, or the best that can be purchased, true to name. If they are cross-bred, make sure that it has not been with an early sort, or a great deal of trouble will be experienced at harvest time. About June plant these bulbs in rows, leaving a space of about 3ft. between every two rows, there will then be little trouble in gathering the seed heads. Promptness is required in gathering the seed when ready, as if left to get over-ripe much may be lost in handling. The heads should be cut off when about one-half of the seed is showing, and placed into large calico bags, so that it may be spread out thinly in the sun. When dry, thresh it out and put it through the winnow. Take note that the onion seed loses its vitality very quickly, and should not be sown after two years old. After ploughing or digging a piece of loose dark soil, burn leaves and bark of trees on top of same, so that the ashes can be raked in before sowing the seed. This burning will force the growth of the plants, and will also help to prevent weeds from growing. Sow the seed in April in drills about an inch deep. If water is laid on set the sprinklers going, and the young plants will show up in about three weeks. However, there will usually be sufficient rain to start the seed. Keep the seedbed well hoed, and by about the month of September, or when the plants are about 6in. high, transplant them in rows 7in. apart, putting the plants 4in. apart. Three rows may be set on two plough furrows 10½in. wide. When the planting is done after the plough, a line will not be required, and much of the stooping will be obviated by walking along the open furrow whilst planting. Do not pull the plants when wet. Trim their tops and roots a little, so that they may be the easier handled. The former leaves usually die off; but after a shower of rain they will take fresh root, and the hoe will need to be kept going to keep down weeds and the top soil loose. Some growers do not practise transplanting, and prefer to either drill in the seed or sow it broadcast at the end of winter, and when the plants are about 3in. high, thin out for a crop. The former plan, although the work of planting takes much time, is the surer and better one in this district. A good crop of onions should not be made up with a lot of "stiff necks." Good seed, with thorough cultivation on suitable land, will produce even-sized, solid bulbs. When the tops have fallen over they should be pulled and placed in rows, taking care to cover the bulbs with the tops, to prevent the sun from scorching them. When dry, the tops and roots may be pulled or cut off, and the onions graded and bagged ready for market. The gunnybag has been used in the past, but the present-sized cornsack now in use is suitable. Use only new bags for export, and brand the bags well. In dry seasons the crop may be doubled by

irrigation, the use of sprinklers being the best method. Diseases of this plant here are almost unknown ; and, unlike potatoes, the onion is not hurt by the severe frosts. The chief trouble is with the lucerne flea, which attacks the young plants in the seedbed. A remedy for this is a spray of strong tobacco-water. Slugs also decrease the crop in wet seasons. Dusting with lime is recommended ; but the hoe will help to eradicate the pest. Onion growers, who do not make big profits, will not be able to say they have had no work. In conclusion, I would like to say it is necessary for producers to co-operate more in disposing of their goods, not with the idea of skinning the consumer, or even the middle man, but to find other markets that are wanting. Although Australia has been abundantly supplied with onions at times, on other occasions it has been necessary to import from New Zealand, Italy, and South America ; therefore, when our markets are overstocked we should try South Africa and other countries.

VARIOUS OPINIONS.

Mr. C. Ricks (Cherry Gardens) indorsed the remarks made by the writer of the paper. It had been represented that a member of the Mount Barker Branch had kept onions for 18 months, and he desired an explanation of how this had been done.

Mr. Simper said that the onion referred to was of the Brown Spanish variety. As a general rule onions would not keep for such a long period, but in this particular case the vegetable had certainly kept for that period ; in all probability it had been stored in a warm, dry atmosphere.

Mr. J. Mitchell (Lyndoch) had been growing onions for a number of years. His experience had tended to prove that the bulb increased in size more when the top had fallen over. The keeping quality depended very largely on the variety. The greatest difficulty was to secure a remunerative price for the crop. This year the prices ruling were good, but in all probability next year there will be a much lower market.

Mr. Simper said it was necessary for the South Australian producer to look to other parts in order to find a market for this crop. During the present season he had sold consignments to West Australian buyers, and there was a probability that South Africa would purchase. Brown Globe was a payable variety. He had found that when good seed was sown, and the land was well cultivated, the tops would turn over of their own accord.

Mr. W. J. Dale (Northfield) expressed the view that the growth of onions and potatoes should receive more attention from farmers generally. He had successfully grown a crop this year, but would like to know the best quantity of stable manure to be applied to land for onion-growing.

Mr. Simper was of the opinion that a dressing about 2in. thick was most suitable. He would, however, recommend growers to experiment with different manures.

AFTERNOON SESSION.

Mr. A. M. Dawkins presided over a large attendance of delegates.

SELLING CATTLE BY LIVE WEIGHT.

Mr. Brown (Port Elliot) moved—"That this Congress is of opinion that fat cattle should be sold by live weight, and requests the Advisory Board to take action with a view to having the system introduced." He stated that his Branch considered that it was only fair to the cattlebreeder that the exact weight of the beast should determine the price to be paid. Guessing competitions held at various shows had proved that both farmers and butchers frequently guessed very wide of the mark when estimating the weight of a beast. The butcher did not guess the weight of his beef when retailing it, but very properly took care that the customer paid for the exact weight received. The cattle of South Australia as a rule were not so wild that they could not be weighed with the proper plant. There was very often no competition between local butchers, and the seller had to take what was offered. If the new system were introduced the beast could be sold at per 100lbs.

Mr. J. Morgan (Narrung) seconded the motion.

Mr. McCormack (Bute) said the question was whether they would get any more for their cattle after having gone to the additional expense of erecting weighbridges. Personally, he did not think they would. Proper weighbridges would have to be provided and fixed at the saleyards, and he could not see that any benefit would be derived.

Mr. A. F. Noll (Quorn) was of opinion that the adoption of the proposed system would entail considerable expense. It was not so much weight as quality that told.

Mr. J. Stone (Meadows) failed to see that any advantage would be gained if the motion were carried into effect. He presumed that it was intended only that fat cattle should be weighed at country saleyards, and as a rule there were not many fat cattle at those yards. Who should bear the expense of erecting the weighbridges?

Mr. S. Ockley (Penola) said that grain was sold at so much per bushel, and he failed to see why cattle should not be sold at per pound. There could be no fairer method. If the system was put in force in the metropolitan area the expense in proportion to the population would be very small.

Mr. Beck (Hooper) understood that the practice of selling by live weight had been in force in Glasgow for the last 40 years, and that should be pretty good proof that it was not against the seller. If a butcher made a mistake under the present system they might feel fairly sure that it was in his own favor. He did not think the expense worthy of consideration, especially as sellers were now losing more than it would cost to instal weighbridges at the large yards.

Mr. J. Stanton (Hartley) thought the motion should be amended to embrace all classes of stock.

Mr. Brown (Port Elliot) in reply, said he thought it would be better at first to confine the principle to one kind of stock. Even if the motion were adopted there would be no compulsion on those who wished to rely on their own judgment to put their cattle on the weighbridge.

The resolution was carried on a show of hands by a small majority.

THE ADVANTAGES OF ASSOCIATING WHEAT WITH SIX-ROW BARLEY ON SOME OF OUR LOWER NORTH FARMS.

Professor A. J. Perkins (Principal Roseworthy Agricultural College) contributed the following paper on "The Advantages of Associating Wheat with Six-row Barley on some of our Lower North Farms":—

THE OVERWHELMING PREPONDERANCE OF WHEAT IN SOUTH AUSTRALIAN FARMING.

Whilst we are all tolerably familiar with the fact that South Australian farming is confined mainly to the growing of wheat, few perhaps, realise how completely this useful cereal has monopolised all our available arable land. Hence I have thought it well to preface my advocacy of the modest claims of another type of crop with statistical data indicating what was the general disposal of arable land in South Australia in 1910. This information has been summarised below in Table I.

TABLE I.—*Showing General Disposal of Arable Land in South Australia in 1910.*

Crops.	Areas.		Percentage of Total Areas. %
	Acres.	Acres.	
Wheat—			
For grain	2,104,717		
For hay	336,439		
Bare fallow	1,263,243		
		3,704,399	89.44
Oats—			
For grain	77,674		
For hay	96,062		
Bare fallow	89,908		
		263,644	6.37
Malting barley	23,245		
Bare fallow	7,373		
		30,617	0.74
Sown grasses	—	26,416	0.64
Vineyards	—	22,952	0.55
Orchards	—	22,410	0.54
Green forage	—	20,728	0.50
Cape barley	11,228		
Bare fallow	5,810		
		17,038	0.41
Other hay and bare fallow	—	10,585	0.26
Pease	—	9,629	0.23
Potatoes	—	7,812	0.19
Market gardens	—	2,818	0.06
All other crops	—	2,944	0.07
Total cultivated area in 1910	—	4,141,992	100.00

We see, therefore, that close on 90 per cent. of a total cultivated area exceeding 4,000,000 acres in extent was directly absorbed in 1910 in the growing of wheat in one form or another; that oats absorbed between 6 per cent. and 7 per cent. of the same area, and that no more than 3 per cent. to 4 per cent. of this area was left available for all other forms of agricultural enterprise.

I am not here to argue that we grow too much wheat, nor even that we are unreasonably capricious in our ostentatious neglect of other types of crops. So long as the average net returns from wheat show good interest on the capital value of land there is no crop more congenially adapted to the climatic and economic conditions that form our agricultural environment. The capital value of land, however, is a variable quantity, not exclusively under the influence of existing farming average net returns. Within quite recent years have we not seen it sent up with a rush by a gradually expanding population, by improved methods of cultivation, and by a run of good seasons perhaps, too? And farms have exchanged hands at prices that would have staggered us some short while back. High prices in land, however, present disadvantages which soon make themselves felt, and as might have been expected, graziers were the first to feel the brunt of them. In this connection the pressure of economic conditions is more effective than that of legislative enactments. When a man comes to realise that money in the bank, or in gilt-edge securities, will return him both a higher and more certain income than grazing he sells his land to those who can turn it to better advantage and invests his capital elsewhere. The sum, on the other hand, which the farmer can afford to pay for his arable land is strictly limited by the average net returns of his crops; and here, it is to be feared, if wheat-growing alone is to be depended upon, that many a recent purchase has gone perilously close to the margin of safety. With wheat as the only saleable crop raised, or farming reduced to its simplest expression, the determination of average net returns has a beguiling appearance of simplicity. Nevertheless, where management is chiefly concerned, so much depends on the personal factor that no one individual can hope to put forward estimates likely to meet with general acceptance. And if, with a view to strengthening my case, I am about to make the attempt, it is with open eyes and with full consciousness of my own shortcomings in this unaccustomed role.

THE AVERAGE NET RETURNS FROM WHEAT.

I take it that average net returns are bound up with three factors, viz.—(1) Average yields; (2) average prices; and (3) cost of production. The first factor, albeit varying from district to district and from farm to farm, admits of comparatively easy determination. Over the past 10 years the mean wheat yield of the State has been represented by 9bush. 13lbs., with extremes of 3bush. 38lbs. in 1902 and 13bush. 15lbs. in 1909. The State

average covers too wide an area for my purpose ; I shall therefore narrow the field to the Lower North, in which for the present I am mainly concerned. Between 1902 and 1911 the Lower North wheat average was represented by 12bush. 14lbs., with extremes of 6bush. 5lbs. in 1902 and 16bush. 27lbs. in 1909. These averages, it is true, include farming practices both good and indifferent ; ventures both lucky and unlucky ; and, in the circumstances, if we take 16bush. as a normal and possible average we shall not have understated the case.

In the matter of prices, too, we continue on tolerably safe ground. I find that over the past 10 years the export value of wheat has averaged on the Melbourne market slightly over 3s. 4d. a bushel. This is not, of course, the price realised by the inland farmer ; and in South Australia we have honorable understandings to be taken into consideration too. Hence if, for the sake of argument, I adopt 3s. 6d. a bushel as an average price I shall not be accused of understating the case. Sixteen bushels an acre at 3s. 6d. represent, therefore, two years' gross revenue from arable land, or £2 16s. an acre.

What, on the other hand, is in present circumstances the average cost of production of wheat ? And here I know that I am treading on thin ice. I have seen the cost of production set down as low as 15s. an acre and as high as 45s. and 50s. Unquestionably the personal equation very largely dominates the situation. Nevertheless—merely as an expression of personal opinion—I do not think, if everything be taken into consideration, that the cost of production of wheat can be put down at much less than 40s. an acre. This leaves us with 16s. an acre to cover both two years' net profit and two years' interest on capital value of land or rent. An average net return of this kind, in my view, limits the *maximum* value of good arable land in existing conditions of farming to £6 or £7 an acre ; and we all know that within recent years these figures have frequently been exceeded, and at times very considerably so.

THE POSSIBILITY OF MATERIAL INCREASE IN THE AVERAGE YIELDS OF WHEAT.

It may be urged that in the course of time the average yields of wheat will tend to increase still further in response to still further general cultural improvements ; that what we have seen accomplished within our own times will be repeated in the future ; and, within certain limits, this is no doubt possible. It is as well to recollect, however, that increased average yields do not necessarily carry with them a corresponding increase in average net returns. They are generally acquired at the cost of heavier expenditure of capital ; and if they contribute towards swelling the public revenues they do not necessarily have a corresponding influence on the income of the individual chiefly concerned. Independently, however, of their relative profitableness there are definite limits beyond which average yields cannot

be expected to rise; and these limits are determined mainly by climatic factors over which we can have no control. If we scan the average yields of the principal wheat-growing countries of the world we shall see that the highest yields are recorded for countries placed within the colder and moister portions of the Temperate Zones—countries such as Great Britain, New Zealand, Belgium, Germany, &c. Here in Australia we belong, on the whole, to the hottest and driest portions of the Temperate Zones, if indeed we do not, in our northerly wheat-growing areas, encroach somewhat on the Torrid Zone.

TABLE II.—*Showing Recent Average Yields of the Principal Wheat-Growing Countries of the World.*

Country.	Year.	Area Under Wheat. Acres.	Average Yield per Acre. Bush. lbs.
Belgium	1909	395,244	39 13
Great Britain	1909	1,866,960	33 51
Germany	1909	4,523,311	30 30
New Zealand	1910	322,201	25 44
Canada	1909	7,751,921	21 31
France	1909	16,290,000	21 11
Japan	1909	1,107,540	20 8
Austria	1909	2,957,496	19 16
Italy	1909	11,629,375	16 20
Spain	1909	9,342,700	15 25
United States	1909	46,717,553	15 18
Hungary	1909	8,758,490	14 22
Servia	1909	921,006	14 20
Roumania	1909	4,172,756	13 11
Australia	1910	7,373,017	12 54
Russia	1909	48,644,800	12 28
Caucasia	1909	8,388,054	12 19
India	1910	32,793,638	10 53
Argentine Republic	1909	14,563,420	10 43
Siberia	1909	8,398,824	8 31
Algeria	1909	3,595,088	8 16

The colder wheat-growing countries depend almost exclusively on the slow-growing but heavy-yielding winter wheats; whilst our normal hot, dry climate shuts us out from the use of any but the fast-growing but light-yielding spring types of wheat. There is no doubt that we are able to excel where quality of grain is concerned; but in the matter of mere quantity there are certain fixed limits in the way of general averages which we cannot hope to exceed. If the Lower North as a whole were to average out 16bush. to the acre, good year, bad year, we should be doing very well. Twenty bushels as a general average for a number of years is, however, I believe, beyond our reach, although no doubt easily enough attainable in special circumstances and in individual cases.

CAN THE ASSOCIATION WITH WHEAT OF OTHER CROPS INCREASE THE AVERAGE NET RETURNS FROM LAND?

¶ If we cannot anticipate much in the way of a profitable increase in the average returns from wheat, the question arises as to whether the associa-

tion of other crops with wheat may not help to increase the average net returns from arable land. In this connection various types of forage crops are generally recommended wherever livestock operations are associated with the growing of crops. And no doubt these forage crops have in this direction much to recommend them, as many of us have found. But it is not with forage crops that I am concerned to-day. I believe—and I shall endeavor to show on what grounds—that on many farms of the Lower North if Six-row barley were grown in conjunction with wheat the average net returns from arable land would be appreciably raised.

WHAT IS SIX-ROW BARLEY ?

Let me first indicate what I understand by Six-row barley. You will be aware that on opposite faces of the ear of barley there are usually from 12 to 16 sets of three flowers, placed regularly one above the other, and occasionally more. In some barleys the two lateral flowers abort, and the central flower alone sets, giving rise eventually to a characteristically plump, well-developed grain. In the end, therefore, ripe ears of barley of this type carry only two parallel rows of grain; these constitute the Two-row barleys, and are commonly known among us as Malting barleys or English barleys. With these barleys we are not, however, concerned to-day; for, whilst their value is undeniable in the cooler districts of the State, I am not of the opinion that they are generally adapted to the districts we have under consideration.

In Six-row barleys each individual flower in the set of three, sets and develops ultimately into grain; in the end, therefore, on the mature ear we have six parallel rows of grain. It is the time-honored local custom to class these barleys as "Cape barleys." I have neither seen nor heard of this name elsewhere, and I am at a loss to account for its origin. It is sometimes customary to subdivide Six-row barleys into Square-headed and Hexagonal-headed varieties, according as the central grain tends to crowd out more or less the two lateral ones. These distinctions, however, need not worry us for the present, since we are concerned mainly with the Square-headed varieties, which, so far as I am aware, are the only ones grown in Australia. It will be understood, therefore, that by Six-row barleys I mean those generally referred to here as Cape barleys.

THE ADAPTABILITY OF SIX-ROW BARLEY TO OUR CLIMATE.

So far as climate is concerned, it will be found, I think, that in South Australia Six-row barleys will thrive wherever wheat has been found to do so. That these barleys are quite as drought-resistant as wheat, if indeed not more so, there is not the slightest doubt in my mind. In Egypt, in the immediate neighborhood of Alexandria, the average yearly rainfall is about 7 in., and it is found there that Six-row barley is the only crop that can be grown satisfactorily without irrigation. In Tunisia and Algeria Six-row barleys altogether displace wheat in the hot dry agricultural areas in closest

proximity to the Great Sahara Desert. This power to withstand drought, Six-row barley owes very largely to its rapid growth and its ability to ripen off its grain in a shorter period than the earliest of wheats. With a view to illustrating this point I have looked up the Roseworthy records on the subject. I find that in the period of six years, extending between 1906 and 1911, King's White wheat—the earliest wheat we have—averaged 126 days between germination and full bloom; and that Square-headed barley—one of our selected varieties—averaged exactly the same number of days between these two periods of vegetation. On the other hand, whereas in the same period of years, between the full bloom of King's White and the ripening of its grain there elapsed an average of 50 days, this period was shortened to an average of 38 days in the case of the barley. And we all know that in a period of 12 days much may happen in the course of a hot summer that may prove detrimental to the perfect development of the grain. In brief, then, in the opinion and experience of those countries in which Six-row barleys are chiefly grown—namely, North Africa, Asia Minor, Southern Europe, &c.—they are looked upon as hardier than wheat under droughty conditions of climate. I am quite aware that this is contrary to British views on the subject. It does not appear to me, however, that these views can weigh down the evidence of countries in a far better position than Great Britain to judge where matters of drought-resistance are concerned.

Barley is reputed to fear frosts, and no doubt in this direction the resistance of wheat is greater. I am not aware, however, that as a rule frosts are sufficiently severe to the north of Adelaide seriously to interfere with the good growth of barley. In districts in which the winters are unusually cold barley will not make much growth in the winter months, and should, in consequence, be sown earlier than would be advisable elsewhere. But I cannot conceive of a winter here sufficiently severe to destroy a well-established crop of barley.

THE REQUIREMENTS OF SIX-ROW BARLEY IN THE MATTER OF SOILS.

In the matter of soil barley is as easily satisfied as wheat, where mere growth is concerned. It has, however, its predilections, particularly in the matter of yields and quality of grain—but so has wheat, for that matter. If wheat may be described as the cereal thriving best on the heavier types of calcareous loams, and rye on the lighter sandy soils, barley may be said to be seen to best advantage on soils intermediate to the two. The quality of the grain is good, and the yields frequently excellent in light mallee land of limestone formation, and in all similar types of soil. Great natural or artificial fertility in the soil is not essential to the wellbeing of barley; not infrequently, indeed, they are rather obstacles in the way of heavy yields. In very rich soils, or in soils high in condition, barley is almost invariably too rank in growth for either heavy yields or good grain. The crop is readily lodged by rough weather on the one hand, and the ears are apt to blight off

on the first touch of summer on the other. In these conditions, whilst the grain may be abundant at harvest time, it is generally small, pinched, weighs very light, and is of low commercial value. Mishaps of the kind are of more frequent occurrence in heavy than in light soils, and particularly so in all soils rich in organic matter, in which barley yields abundant green forage, but very poor grain. On the whole, therefore, for the best results barley should be placed in soils of medium consistency and moderate fertility.

POSITION OF SIX-ROW BARLEY IN ROTATION.

We are all in accord as to the position that should be given to wheat in any rotation in which it is made to enter. It must be preceded either by bare fallow or by a crop calculated to improve the general fertility of the soil, to crowd out and prevent the seeding of weeds, and to leave the soil in a condition that permits of the preparation of an adequate seed bed. Six-row barley is, in this connection, far less exacting than wheat; and the fact that, if anything, it fears an excess of fertility, enables it to follow with advantage a crop that has already partially exhausted the available fertility of the soil. There are few weeds, too, that a well-grown crop of barley cannot crowd out and get the better of. Nor is that consolidated seed bed, that it takes us so many months to build up for wheat, essential to the success of barley. It is for these reasons, therefore, that, in my view, there is no crop that follows wheat, that has been preceded by a year of bare fallow, to better advantage than Six-row barley. And I venture to suggest, as likely to prove more profitable on many a Lower North farm than the rotations usually in use, the following alternative rotations:—(A) First year, bare fallow; second year, wheat; third year, barley; or (B) first year, bare fallow; second year, wheat; third year, barley; fourth year, pasture.

PREPARATION OF THE LAND FOR SIX-ROW BARLEY.

No particular difficulty offers in the preparation of land for Six-row barley following on a crop of wheat or wheaten hay. The wheat or hay stubbles can first be grazed over and trampled under foot by livestock; or if this is not possible, they can be burnt down. The first breaking up of the stubbles would take place in February and March; a time of the year when time is apt to hang heavy on the wheat farmer's hands, and when his teams are doing little or nothing towards earning their living. The plough—as indeed should invariably be the case in all forms of summer ploughing—should be followed as speedily as possible by a heavy land-roller, or preferably by a clod-crusher of the Crosskill type. Where possible, the area ploughed up in one day should be rolled in the same day, or the day following. Cultivators and harrows will complete the work, and reduce the land to a suitable condition of fine tilth. For, be it recollected, that if a consolidated seed bed is not essential to the success of barley, one that is finely divided is. There

is an old French proverb to the effect that whilst wheat should be sown in mud, barley should be sown in dust.

SEEDING OPERATIONS.

Here, again, at seeding time, in the matter of distribution of work, barley dovetails in admirably with wheat. According to circumstances, it may be sown either before or after the latter. Under our usual conditions of climate Six-row barley is, as a rule, better sown somewhat late in the season, and after wheat—towards the latter end of May and the beginning of June, in the Roseworthy district, for example. If sown much earlier the crop is apt to become over rank and winter-proud; and, in the end, both quality of grain and yield are the sufferers. In any district, on the other hand, in which the average winter temperature is sufficiently low seriously to hinder the winter growth of barley, earlier sowing might perhaps be resorted to with advantage, in order that the plants may get a good grip of the soil before the cold weather sets in. Even in normal localities very early sowing of barley may be resorted to without ill effects, providing the precaution be taken to feed off the crop heavily with sheep once or twice, according to the requirements of the season. It is worth noting in connection with early sowing that barley does not fear that half-moist condition of soil which invariably leads to the malting of wheat grains. In seasons that open unfavorably, therefore, it may be sown whilst wheat seeding operations are suspended, particularly as it has little to fear from the competition of weeds that will germinate with it.

At Roseworthy, 50lbs. to the acre is our usual standard rate of seeding for Six-row barley; occasionally, when the field is known to be very dirty, we use as much as 70lbs. to the acre. In a general way, however, thick sowing is not to be recommended for barley. Its principal objection is an increased tendency in the crop to lodging. As a matter of fact, Six-row barley stools very freely, and there is very little to be gained in forcing the quantity of seed sown.

Barley can be drilled in deeper than wheat, although in ordinary circumstances there is nothing to be gained in exceeding the 2in. limit.

MANURES.

In the matter of manures the local requirements of barley are very much the same as those of wheat. Hence, in our soils, barley should be drilled in with the quantities of superphosphate that have been found to answer best for wheat. I have already adverted to the fact that too much available nitrogen in the soil is, if anything, more or less detrimental to barley. It represents, however, a contingency that must always remain of rare occurrence where barley is made to follow immediately in the wake of a wheat crop. When barley is sown on very light sandy land a dressing of from $\frac{1}{4}$ cwt. to

$\frac{1}{2}$ cwt. of sulphate of potash to the acre, drilled in before seeding, will often prove necessary.

AFTER-TREATMENT OF BARLEY.

Between seeding and harvesting operations there will be little or nothing to be done to a well-grown crop of Six-row barley raised under the conditions indicated. In certain circumstances, if it is thought necessary, the crop might be harrowed or rolled, or subjected to both operations. At Roseworthy, although we have been growing barley with success for many years, we have rarely had occasion to roll or harrow a barley crop; although where wheat is concerned either or both operations have frequently been found necessary.

In spite of all precautions, however, particularly in years of mild frostless winters, a crop of barley may show a tendency to run away from itself and become over-rank in growth. When such is the case one should never hesitate to feed off with sheep a crop of barley; for there is no crop that can be fed off with greater impunity nor which responds better to the treatment. By way of caution it should be added that it is not wise to feed off a crop of barley at a time when a spell of cold frosty weather has set in. In similar circumstances I have known a barley crop never to recover from feeding down. In brief, whilst I am not of those who hold that any and every crop benefits, no matter what the circumstances, by being promiscuously fed down, I am strongly of the opinion that for success at harvest time every rank crop of barley should be fed down heavily with sheep, particularly if it should happen to have been sown somewhat early in the season.

HARVESTING OPERATIONS.

I suppose I shall be told that barley is far more troublesome to reap than wheat; and I shall admit the impeachment if stripper or complete harvester are to be turned into a rank-grown, badly-lodged crop of barley which had not been fed off in the winter time. These, however, are contingencies that should have been foreseen earlier in the season, and forestalled accordingly. The stiff awns, too, are no doubt apt to choke both reaping and cleaning machinery, particularly if the crop be at all heavy. I do not know, however, that troubles of this kind are not the natural consequences of lack of experience in handling an unfamiliar crop, and that increased experience only is needed to make the rough ways smooth. I have, at all events, heard a neighbor of ours, who always puts in a little barley, state that with a complete harvester he could always undertake to make a better sample from a crop of barley than from a corresponding crop of wheat. On the whole, I think it will be admitted that these harvesting difficulties cannot be classed as insuperable; and if they constitute the only obstacles in the way of a more extensive use of Six-row barley as an ordinary farm crop I have no fears as to what is likely to be its future in our midst.

**THE AVERAGE NET RETURNS FROM A ROTATION IN WHICH WHEAT IS
ASSOCIATED WITH SIX-ROW BARLEY.**

I have now indicated the lines along which I imagine that Six-row barley can be utilised by us to best advantage. I have also stated my conviction that its more general use on Lower North farms will lead to an increase in the average net returns from arable lands. I shall now proceed to show the extent to which I imagine that this is likely to be the case. For the purpose I shall take the three-year rotation suggested by me, viz.—(1) Bare fallow, (2) wheat, and (3) Six-row barley, which, in so far as average net returns are concerned, must be compared with wheat and bare fallow alternating continuously. It should be added that the same arguments will hold good where a year's pasture is made to intervene every third or fourth year.

I shall, in the first place, assume that the cost of putting in and taking off a crop of Six-row barley remains approximately the same as that adopted for wheat, viz., 40s. an acre. Such, at all events, is our experience.

As in the case of wheat, average gross returns are dependent on average yields and average prices. Unfortunately, the returns from the Statistical Department have not distinguished until quite recently between Cape or Six-row barley on the one hand, and English, Malting, or Two-row barley on the other; and in my experience the yield of Six-row barley is, under our conditions of climate, between 25 per cent. and 33 per cent. higher than that of Two-row barley. I find that between 1901 and 1911 the aggregate yield of these two types of barleys was represented for the State by 16bush. 23lbs. Over the same period I have already stated that the average yield of wheat was represented by 9bush. 13lbs. We have, however, grown Six-row barley on the College Farm fairly extensively for the past eight years, and a careful record of its average yields has been kept. I have summarised below, in Table III., details concerning these average yields of Six-row barley comparatively with those of wheat on the College Farm.

*TABLE III.—Showing Average Returns from Wheat and Six-row Barleys
at the Roseworthy Agricultural College between 1904 and 1911.*

Year.	Rainfall.		Barley.			Wheat.		
	"Useful."	Total.	Area.	Yield		Area.	Yield	
	April- November. Inches.			per Acre.			per Acre.	
		Inches.	Acres.	Bush.	lbs.	Acres.	Bush.	lbs.
1904	11-00	14-70	27-86	38	33	330-00	18	3
1905	14-23	16-71	65-73	25	4	212-00	24	11
1906	16-30	19-72	51-00	40	38	318-00	14	30
1907	13-81	15-05	79-30	31	21	178-00	13	20
1908	15-53	17-74	94-83	43	49	258-00	22	14
1909	21-15	23-05	75-27	35	0	328-47	25	5
1910	16-79	23-87	113-42	37	9	267-35	16	38
1911	8-19	12-42	76-09	39	31	234-98	14	17
Means for eight years (1904-11)	—	—	—	36	23	—	18	32

It will be seen, therefore, that from 1904 to 1911 Six-row barleys averaged on the Roseworthy Agricultural College Farm 36bush. 23lbs., whilst in the same period of time wheat averaged 18bush. 32lbs., *i.e.*, Six-row barleys yielded exactly twice as much as wheat. Hence, since I have assumed an average yield of wheat for the Lower North of 16bush. to the acre, 30bush. of Six-row barley cannot be looked upon as an extravagant average to suggest. To those who are without experience of this crop, and to whom the yield may appear high, I would point out that on the College Farm we have frequently secured from Six-row barley yields of 50bush. to 60bush. to the acre, and in exceptional cases even higher. In any case, if the average yield of Six-row barley is to be reduced in these estimates a corresponding reduction must be made in the average yield from wheat, and the arguments to be derived from the higher yields will still hold good.

For reasons that I propose looking into later on, the market price of Six-row barley is subject to more frequent and violent fluctuations than is that of wheat. I find, however, that for the period of 10 years extending between 1901 and 1910 Cape barley has averaged on the Adelaide market slightly over 2s. 7d. a bushel. If, then, we adopt this figure, together with 30bush. an acre as an average yield, we shall find the gross average returns from Six-row barley to be represented by £3 17s. 6d. an acre.

We are now in possession of all data necessary to establish a comparison between the average net returns from wheat grown regularly after bare fallow, and a rotation in which a crop of wheat is always followed by a crop of barley. For the purpose we must take into consideration a period of six years, in which on the one hand we shall have three crops of wheat to our credit, and on the other two crops of wheat and two crops of barley. I have summarised below, as clearly as possible, a statement from which the average net returns may be derived in each case.

AVERAGE NET RETURNS FROM LAND ALTERNATELY UNDER WHEAT
AND FALLOWED.

	Receipts. £ s. d.		Expenditure. £ s. d.
Preparing land, putting in and taking off three crops of wheat	—	..	6 0 0
Returns from three crops of wheat	8 8 0	..	—
Balance available to meet six years' interest on capital value of land and net profit	—	..	2 8 0
	<u>£8 8 0</u>	..	<u>£8 8 0</u>

In the case, therefore, of wheat alternating regularly with bare fallow the average net returns available to meet both interest on capital value of land and net profit average out at 8s. per acre per annum.

**AVERAGE NET RETURNS FROM LAND IN WHICH WHEAT AFTER BARE FALLOW
IS SUCCEEDED BY SIX-ROW BARLEY.**

	Receipts.		Expenditure.
	£ s. d.		£ s. d.
Preparing land, putting in and taking off two crops of wheat and two crops of barley	—	..	8 0 0
Returns from two crops of wheat	5 12 0	..	—
Returns from two crops of barley	7 15 0	..	—
Balance available to meet six years' interest on capital value of land and net profit	—	..	5 17 0
	<u>£13 17 0</u>	..	<u>£13 17 0</u>

When, on the other hand, a crop of barley is made to follow wheat which has been preceded by bare fallow the balance available to meet interest on the capital value of land and net profit is represented by 19s. 6d. per acre per annum.

I know very well that these figures can claim to be no more than personal estimates of the situation. I am also conscious of the difficulty of making average estimates, however well thought out, square with all the circumstances of individual cases. I do not, therefore, for a moment anticipate that all those who decide to try their hand at barley must necessarily achieve results that appear to me to represent the average possibilities of the position. I trust, however, that those who fail will not accuse me of juggling with figures; that they will recognise that my "estimates," such as they are, are based on facts that are *facts*, and that the groundwork of calculation has been indicated sufficiently clearly and fully to enable others to draw up estimates more in keeping with their individual cases. It appears to me, however, that the difference between the estimated average net returns from land of 8s. an acre on the one hand, and of 19s. 6d. an acre on the other is sufficiently great to leave ample margin for any unintentional error or exaggeration in the estimates. May I therefore express the hope and anticipation that, by some at least of those whose land is adapted to the growing of Six-row barley, these anticipated results of mine may be realised.

I propose next examining some of the objections that are sometimes raised to the growing of Six-row barley.

**WHAT IS LIKELY TO BE THE POSITION OF THE BARLEY MARKET IF BARLEY
WERE GROWN MORE WIDELY IN SOUTH AUSTRALIA THAN IS AT PRESENT
THE CASE ?**

It has sometimes been put to me—and with good apparent reason, I think—that if Six-row barley were grown at all extensively within the State it would soon become a drug on the market, which farmers would find it difficult to dispose of. If I thought that such was likely to be the case I would not dream of advocating its wider cultivation. As a matter of fact, however, I firmly believe that the reverse would be the case. I have already referred to the violent fluctuations in price to which barley is in present circumstances

exposed on the local market. These I take it to be the natural consequences of a somewhat limited local demand, and an average supply insufficient to warrant the opening up of a regular export business. In other words, as we stand at present, the barley market is like the pig market, subject to periods of glut and periods of scarcity, when, as is at present the case, the locally-grown article cannot even be quoted. Indeed so irregular and scanty are the usual local supplies that buyers, I understand, always experience the greatest difficulty in purchasing outright 100 bags or so of even sample. From personal experience I know that our usual yearly contribution to the market, of 1,000 bags or thereabouts, is eagerly competed for, and always realises higher prices than those quoted at the time in the daily press.

I do not suppose that anybody doubts that good Six-row barley, if available for the purpose, could be exported quite as readily as wheat. Whenever we have anything worth selling it is generally to the moneybags of Great Britain that we look; and in this connection I owe it to the courtesy of the Under Secretary, Mr. L. H. Sholl, that I am able to summarise below, in Table IV., recent data concerning the British imports of barley:—

TABLE IV.—*Showing recent (1907-11) Average Yearly Imports of Barley into Great Britain.*

Countries whence Consigned.	Quantities Imported. Bushels.	Values.	
		Total. £	Per Bush s. d.
Russia	18,338,880	2,432,818	2 8
United States	5,735,654	953,693	3 4
Turkey	5,668,006	895,135	3 2
Roumania	5,496,781	763,510	2 9
British India.....	1,874,083	256,720	2 9
Morocco	1,677,312	235,440	2 10
Tunis	1,093,613	177,707	3 3
Chili	936,723	160,495	3 5
Tripoli	780,102	131,392	3 4
Algeria	757,478	124,158	3 3
Canada	745,069	103,640	2 9
Austria-Hungary	630,874	130,037	4 1
Persia	470,848	61,616	2 7
Germany	329,804	66,006	4 0
France	258,191	44,928	3 5
Denmark	236,096	44,845	3 10
Cyprus	218,221	34,556	3 2
Argentine Republic	114,733	15,970	2 9
Bulgaria.....	107,430	14,819	2 9
Australia	64,467	10,688	3 4
New Zealand	48,160	8,104	3 4
Belgium	22,579	3,871	3 5
Netherlands	13,619	2,014	2 11
All other countries	143,674	24,851	3 6
Average total imports.....	<u>45,762,397</u>	<u>£6,697,013</u>	<u>2 11</u>

It will be noticed that Great Britain draws her barley supplies from all parts of the world, and that we contribute but an infinitesimal share towards

them. Between 1907 and 1911 the total British imports of barley averaged yearly 45,762,397bush., valued at £6,697,013, or over 2s. 11d. a bushel at the port of landing. In order to realise what these figures imply it is worth noting that between 1901 and 1910 the average yearly total exports of wheat (including flour expressed in terms of wheat) from the Commonwealth as a whole were represented by 29,788,653bush., *i.e.*, not much more than one-half the number of bushels of barley imported annually by Great Britain. In the circumstances, therefore, I think it will be agreed that the British market alone is quite capable of absorbing any exportable surplus of barley that is likely to be produced by South Australia within our times.

It may perhaps be thought that the imports into Great Britain of barley may consist chiefly of the Two-row types, or malting barleys. I am pleased to be able to add, therefore, that after a careful analysis of the countries from which the barley supplies of Great Britain are derived, and with a full knowledge of the types of barley usually grown in these countries, out of an average yearly total approaching 46 million bushels, between 35 and 40 million bushels are almost certainly of the Six-row barley type.

I trust that these statements will serve to dispel the fears of those who appear to anticipate that large areas under barley would give rise to a difficult market position.

IS THE PRESENCE OF BARLEY HEADS IN THE WHEAT FIELD NECESSARILY CONNECTED WITH THE GROWING OF BARLEY ON THE FARM ?

Nobody is particularly pleased to see vigorous barley heads waving over a wheat field, and it is stated that if we allow barley to be grown in regular rotation with wheat the wheat field will never be free from stray heads of barley. I entirely disagree with this view, and can speak from the standpoint of eight years' experience in the matter. For the last eight years we have grown barley on the Roseworthy Agricultural College Farm fairly extensively; and we have not only grown the crop, but we have also fed the grain regularly to pigs—and occasionally to horses and cows—and the manure has found its way into the fields. Notwithstanding this, I think that I can fairly claim that our wheat fields are quite as free from barley plants as those of our neighbors who neither grow nor handle barley. I am strongly of the opinion that this should always be the case with ordinary care whenever wheat is separated from barley by an interval of a year's bare fallow, and particularly so if a year of pasture is additionally made to intervene.

The precautions to be taken to prevent the promiscuous distribution of barley over the land are elementary enough. Seeding, harvesting, and cleaning machinery should always be thoroughly overhauled when passing from barley to wheat; and barley grain fed to livestock should always be crushed, soaked, or steamed. Seed supplies, however, is the most common

channel through which barley finds its way into the fields; and I find that we are rarely able to escape contagion when we sow oats, the seed of which we are compelled to purchase from outside sources. If ordinary seed, however, be put through a modern grader the great bulk of barley grains can be very readily removed. May I point out here that, in my view, an efficient seed grader is an essential part of the plant of every well-equipped farm that is too often overlooked? The price of a good grader is perhaps beyond the means of a small farmer, who could put it to very limited use only. Might I suggest that individual Branches of the Agricultural Bureau might with great advantage to themselves and the State purchase jointly one seed grader, which could be used by the various members in rotation between harvesting and seeding operations?

Let me then assure you, on my own personal experience, that the farmer who grows barley is not under compulsion to advertise the fact in his wheat and hay fields.

DOES A HEAVY CROP OF BARLEY EXHAUST THE CONDITION OF THE LAND SUFFICIENTLY TO AFFECT THE YIELDS OF WHEAT FOLLOWING TWO OR THREE SEASONS LATER?

I have been told by some that in their experience a heavy crop of barley had the effect of reducing the yields of the wheat crops that followed. In reply to this, all that I can say is that I have been growing heavy crops of barley for a number of years, and cannot say that I have observed this to be the case. A crop may fail more or less for a variety of reasons, and it is possible that we have here a case of mistaken conclusion. It is true that barley is surface-rooted to a greater extent than wheat, and it is possible that if a 3in. to 4in. furrow is never exceeded at fallowing time the wheat plant may suffer from having to depend too exclusively upon the surface layers, already depleted of their available fertility by the preceding barley crop. If such be the case, the remedy is obvious—fallow deeper after a good barley crop.

IS THE ADMITTED LIABILITY OF BARLEY TO LOOSE SMUT AN INSUPERABLE OBJECTION?

It is admitted that barley is very subject to attacks of loose smut, and that it is no easy matter to free smutty seed from the spores of the disease; nor is it difficult to realise why this should be so. In the first place, in the early summer, when the atmosphere of a smutty field is fairly permeated with the impalpable black powder, the husks of the sound grains have not yet closed down firmly on the grain which they enclose, and it follows that some of the minute spores may penetrate between the outer husk and the seed, where they will continue until the grain germinates. No amount of external pickling can possibly reach them, with the exception,

perhaps, of the hot water method, which in ordinary circumstances can hardly be looked upon as a practicable method of pickling. Again, the grain of barley, with its coarse outer husk, is far rougher than the naked grain of wheat, and unless very carefully pickled it is not possible to reach even those spores that adhere to it externally. It is, in my opinion, idle to imagine that the mere fact of dipping a bag of wheat into a solution of blue-stone and then allowing it to drain, will have the effect of destroying all the spores adhering to the grains. These grains may be described as being more or less greasy, and protected from complete contact with the liquid by a coat of air bubbles, which shield the smut spores from contact with the poisonous fluid. Unless these grains are repeatedly and thoroughly stirred up they have not the slightest chance of becoming completely wetted, and therefore pickled. If this is true of wheat, it is all the more so of barley grains, protected as they are by a rough, coarse husk.

My own view on the matter is that for barley it is essential to secure seed from a field known to have been quite free from smut, and that pickling can never absolutely be depended upon. Some seven years ago we had a crop of barley that could not have been affected by smut to a greater degree. Since that time it has been a difficult matter to discover a single smutty head in all the fields. I attribute our success in this direction to the use of seed derived from our hand plots, which are naturally quite free from smut.

SIX-ROW BARLEYS FOR MALTING PURPOSES.

We are generally inclined to look upon the grain of Six-row barleys as suitable for feeding and fattening livestock only, and we give emphasis to our views by describing them as "Feed barleys," whilst for the grain of Two-row barleys is specially appropriated the term "Malting barley." That weight for weight and volume for volume the grain of Two-row barleys has greater value to maltsters than the best grain of Six-row barley need not be disputed; the proportion of husk, or waste, is invariably heavier in Six-row barley, whilst the proportion of carbo-hydrates—the most valuable ingredient in malt—is correspondingly lower than is the case in the average grain of Two-row barley. These facts notwithstanding, however, if we take the world as a whole, we shall find that there is quite as much malt made from the grain of Six-row barley as from that of Two-row barley, if, indeed, not more; and that good, well-grown grain of Six-row barley has its value in that direction is, I believe, beginning to be more generally recognised in Australia. When we see good Cape barley quoted at 3s. 6d. to 5s. a bushel, as was the case last season, we can rest assured that it is the maltsters and not the livestock holders who are after it. This is a fact that is well worth bearing in mind, for the price paid for a malting barley is quite other than that which can in ordinary circumstances be paid for a "feed barley." It is true that even for the best possible sample of Six-row grain we cannot anticipate

realising altogether the prices paid for the plump, thin skin grain of the Two-row barleys. We are, however, entitled to expect as much as 1s. a bushel more than is usually paid for ordinary Feed barleys. Hence, in our estimates of average net returns the average price for good Six-row barleys is likely to be nearer 3s. 6d. a bushel than 2s. 7d., the average figure which I adopted.

On the other hand it must be recognised that much of the Six-row barley grown is fit only for feed purposes. This is the case of all the thin, but thick skin, discolored, leathery grain that is often met with. Briefly, the characters essential to a good malting sample may be summarised as follows:—The grain must be even in character, so as not to leave too great a proportion of refuse on grading and cleaning. It must be plump and well-rounded and filled; pale-yellow and bright in color, not dull or discolored, with a soft floury cross section, and not hard and steely. A good malting sample calls for particular attention in harvesting operations. It is absolutely essential that the grain be perfectly sound, with its germ or embryo uninjured, since everything depends on a good, even germination on the malting floor. Broken grains, whilst useless to the maltster are not fatal to the sample, since they can be removed in the cleaning process; but sample showing a heavy percentage of cracked grains, or grains the embryo of which has been more or less injured, are quite useless for malting purposes. And the same may be said of a sample that has been seriously affected by rain during harvesting operations. In the latter case the sample would be more or less discolored. It is not essential that all traces of the awn be removed from the grain; indeed, over-thorough dressing of the grain in this direction is generally fatal to the malting quality of the sample.

No doubt climatic conditions—both general and those peculiar to any given season—have much to do with the quality of a malting sample. There are seasons that are unfavorable, just as much as there are localities that are unfavorable to the production of good malting grain. In a general way those seasons in which summer weather sets in suddenly, with abrupt changes from cool overcast conditions to hot northerly winds, are generally detrimental to the quality of the sample. The grain, as a rule, remains pinched and ill-developed, tough, thick, and leathery in the husk—it has ripened off too suddenly. Heavy rains at harvest time are almost equally detrimental. The most favorable conditions are those leading to a gradual and slow ripening of the grain and bright, dry, sunny days for harvest time. It is said by maltsters that much of our Cape barley is useless for malting purposes. I cannot believe that this is either wholly or generally connected with our climatic conditions. Great Britain draws much of her malting barley from countries equally hot and dry—from North Africa, from Asia, from California, &c., and the quality of sample which these countries can grow we can surely grow too.

Soils and their condition, and methods of cultivation, have also much to do with the ultimate quality of the sample. Anything leading to rankness of growth in the crop is certain to affect the grain detrimentally. I need not, however, dwell on this point, since I have already dealt with it fully higher up.

Finally, the variety of barley grown has much to do with the quality of the grain. At Roseworthy we have had in hand for the past seven or eight years three varieties of Six-row barleys. All three look almost equally well in the field. One of them, however—perhaps the best in the matter of field appearances—invariably yields a rather inferior sample, whilst the reverse is the case with the other two.

By way of conclusion on this aspect of the question, I shall state that, whilst we may not always be able to produce a perfect malting sample, the attempt is always worth making if the high prices realisable be taken into consideration.

SIX-ROW BARLEY FOR FATTENING PURPOSES.

However unsuited for malting purposes the grain of Six-row barley may be, it will always retain its feeding value for livestock; and in this connection in times of low prices, shall we not find it to our advantage not to sell it in kind, but to transform the grain into animal tissues, the money value of which is generally much higher. Apart altogether from the profit we may hope to derive from the fattening increase of our livestock, we shall retain on the farm rich manure which will go towards building up afresh the fertility of our soils, upon which the unavoidable practice of bare fallowing is drawing so heavily. Indeed, so important is this side issue, that if at current rates our feeding accounts only just balance, without leaving any very appreciable margin of profit, the indirect benefit of increasing soil fertility and swelling crop yields will amply compensate us in this direction. Five or six pounds of grain will, in ordinary circumstances, lead to 11lb. increase in live weight of pigs. Hence, it is an easy matter to calculate whether or not feeding is likely to prove profitable at ruling rates. Barley, at 2d. 1s. a bushel, works out to $\frac{1}{3}$ d. a pound. Hence, 11lb. of pork would be produced at the cost of 2 $\frac{1}{3}$ d. to 3d., without taking into consideration the manure produced, which may be set off against any labor that may be entailed. I take it that in ordinary circumstances, whenever barley is worth 2s. a bushel or less, it can be fed to pigs at a good profit. Even at higher rates, when helped along with odds and ends, the speculation should prove a profit-bearing one.

Naturally, when grain-feeding is being considered, barley challenges comparison with wheat. No doubt, weight for weight, wheat is superior to barley as a foodstuff. Roughly, in the proportion of 8 to 7, *i.e.*, 7lbs. of wheat should go as far as 8lbs. of barley. Whether the one or the other can be fed to best advantage will depend exclusively on the relative ruling prices

for each. I have worked out below what would be the corresponding monetary value of barley as a foodstuff relatively to the market values of wheat, varying within the limits that we have been accustomed to within recent years.

TABLE V.—*Showing Money Value of Barley as a Foodstuff Corresponding to an Ascending Series of Wheat Market Prices.*

Market Value of Wheat per Bushel of 60lbs.	Corresponding Value of Barley as a Foodstuff per Bushel of 50lbs.	Difference.
s. d.	s. d.	s. d.
3 0	2 2½	0 9½
3 1	2 3	0 10
3 2	2 3½	0 10½
3 3	2 4½	0 10½
3 4	2 5½	0 10½
3 5	2 6	0 11
3 6	2 6½	0 11½
3 7	2 7½	0 11½
3 8	2 8	1 0
3 9	2 8½	1 0½
3 10	2 9½	1 0½
3 11	2 10½	1 0½
4 0	2 11	1 1

Roughly, then, at normal rates, and from the point of view of its feeding value, wheat is worth about 1s. a bushel more than Six-row barley. When the difference between the market values of the two is greater, barley will represent better feeding value of the two; when the difference is less than that indicated in Table V. wheat can be fed to greater advantage than barley. When, however, the difference between market values is approximately normal, and both wheat and barley are available, it will be good practice to make alternate use of both cereals, by way of variety in diet; since animals, particularly when on fattening regime, quite as much as ourselves, need the stimulus of variety to stir up their jaded appetites.

BARLEY IN THE RATIONS OF WORKING HORSES.

There is a last use for which I intend recommending Six-row barley, and that is an occasional place in the rations of our working horses. I regret much that this point should come up towards the close of a tediously long paper. In justice to my audience I can do no more than indicate the controversial matter that is involved in the discussion; and yet the feeding of our working horses is a subject on which much might be said, and I must say it briefly. First, let it be understood that I have no intention of questioning the supremacy of oats among recognised horse foodstuffs. If I were placed in a locality in which oats could be raised as well and as cheaply as Six-row barley, I should unquestionably give the preference to oats as horsefeed. But, in our experience, heavy yields of grain at all comparable to those of barley can be obtained from oats only in exceptional seasons; and I take it that many portions of the Lower North are similarly situated.

In this connection, therefore, it is for the localities in which oats—essentially a moist cold-country cereal—are more or less precarious as grain crops, that I am speaking.

Those who advocate the use of corn in the rations of working horses are, in this country, faced with two stumbling blocks—(1) the well-nigh universal practice of feeding chaffed wheaten hay exclusively to horses, and (2) the prejudice that corn of any sort, but particularly barley, is heating and injurious to horses. This last trait is supposed to be peculiar to the horses of hot countries, for which wheaten hay is supposed to represent the only possible foodstuff. Now, I must confess that this prejudice—for I can call it nothing else—surprises me not a little. Is it realised by those who hold these views that Australia is perhaps the only country feeding on a large scale wheaten hay to its horses? Before coming out here I lived in a country quite as hot and dry as South Australia, if not more so, in which working horses were fed on nothing else but barley and long straw. Indeed, this is the practice throughout the north of Africa, in Asia, in Southern Europe; in fact, in all countries in which oats cannot be raised to great advantage. What, then, is the matter with the average constitution of our horses that they are said to grow ill at the unwonted sight of corn? Want of use, I fear; and I am persuaded that if they were led up to corn rations gradually they would thrive on them quite as well as the horses of other hot countries. In this connection I may, I think, quote a recent example taken from the working horses of the Roseworthy Agricultural College Farm. In a general way we have hitherto adhered to local custom, and fed our horses very largely on wheaten chaff, and wide have been the areas cut down each year to meet their requirements in this direction. In the present season, however, total absence of natural feed down to spring time unexpectedly threw upon us the hand feeding of 1,552 sheep and 52 head of cattle, in addition to a handful of colts and young horses. I soon perceived that our hay supplies would not hold out against the unforeseen drain put upon them. I was determined not to purchase hay; and consequently our working horses were put upon a regular corn ration, with a little chaff and plenty of long straw; and, in the opinion of the farm manager, they have never been in better fettle, nor have they ever stood the heavy winter work better.

I am not disputing the value of wheaten hay as horse feed. There is ample experience to show that horses will do slow heavy work tolerably well on wheaten chaff alone. As a rule, however, they lack the energy and go of corn-fed horses. My contention is that, even if corn is not habitually fed to horses, in times of drought and high prices barley grain and straw will generally prove a more economical ration than good wheaten chaff. I assume that a draught horse on working allowance will put away with ease a 40lb. bag of chaff a day, of a value of about 1s. at average prices, and considerably more in times of drought. In North Africa a light horse usually

receives about 12lbs. of barley grain a day, distributed in three meals, together with as much long straw in an overhead rack as he cares to take. A heavy draught would probably require about one-half more, *i.e.*, about 18lbs. a day. With barley at 2s. a bushel 18lbs. would represent a value of little above 8½d.; not quite 11d. with barley at 2s. 6d. The grain, therefore, would cost no more than the 40lbs. of chaff at normal rates, and considerably less than the chaff when hay is soaring up to £4 and £5 a ton. True, straw must be supplied additionally in the way of bulk food. This, however, can very readily, and at comparatively little cost, be stacked on any farm on which both wheat and barley are grown; and it should be noted that livestock generally are more partial to barley straw than to that of wheat.

CONCLUSION.

Gentlemen, this question of Six-row barley is no new infatuation of mine. Twenty years ago I left a country in which barley is grown quite as extensively as wheat, and when I came to Roseworthy it appeared to me that the locality was particularly well adapted to the growing of barley. This view I urged upon Professor Lowrie at the time, and he authorised me to import for him some Tunisian barley, which appeared to me superior to the type usually grown here. In those days, however, the superphosphate question had not yet been solved, and Professor Lowrie was too much absorbed in wheat problems to give much attention to the minor cereal; hence nothing came of the venture. Eight years ago I took up the question a second time; and I think I can claim to have demonstrated that both heavy and very remunerative crops of barley can be raised in the Roseworthy district. When I made up my mind to bring up the subject of Six-row barley before Congress I realised fully the difficulty of bringing home to others what is clear as daylight to oneself. I do not know whether I have succeeded in convincing you; nor even if I have treated my subject in the manner most likely to do so. Let me hope, however, that I have interested at least some of you. If I have done so, I am confident that not many years will pass before others in their general practice will be able to show that I have not been over-sanguine in my advocacy of Six-row barley as an aid to the profitable farming of many of our districts. (Applause.)

THE DISCUSSION.

Mr. D. B. Butler (Butler) desired to know whether Six-row barley could be grown on the average mallee land as cheaply as Algerian oats.

Professor Perkins said that at Roseworthy the experience was that they could grow more barley than Algerian oats on the same terms.

Mr. B. Correll (Minlaton) had grown barley, and he strongly recommended all farmers to give it a trial. It was the most profitable second crop that could possibly be grown after wheat. It could be followed up with bare

fallow, or better still, the barley stubble could be left out for one year for grazing, thus providing good feed for lambs. The straw went down very readily, and was easily ploughed in for the purpose of adding humus to the soil. He had secured as much as 30bush. to the acre, and last year he reaped a crop of 47bush. to the acre. Owing to the fact that it lodged badly, it was rather wasteful. Where good cultivation was practised good yields would be secured. It was a mistake simply to drill the crop on the stubble.

Mr. B. McCallum (Willowie) said the Willowie Plains were capable of producing crops of from 35bush. to 50bush. to the acre. The reason the growing of barley had been discontinued in the district was that it got into the wheat crops. (Applause.)

Mr. J. Darley (Narridy) said last year there was a shortage of feed in the district. About the 27th of August he drilled in a small plot of English barley on fallowed land. It came away well, and despite the fact that not more than 1½in. of rain fell, he reaped a yield of 36bush. to the acre. He desired to know whether the English would not be better than the Six-row barley.

Professor Perkins replied that the English did not yield so well as the Six-row barley.

Mr. H. C. Williams (MacGillivray) inquired what crop should follow barley on new land.

Professor Perkins recommended the following rotation:—Bare fallow, wheat, barley, pasture. Barley always shook out, and there was earlier feed on barley stubbles than anywhere else.

Mr. D. Carmen (Pine Forest) said that there was a general belief that barley impoverished the land for wheat-growing. There would have been a great deal more barley sown in his district but for this fact.

Professor Perkins had not noticed any reduction in the yield of the wheat following barley. For eight years he had been growing barley and nothing of this nature had been perceptible. They had a rotation of turnips, barley, peas, and wheat constantly. After eight years the average yield of the wheat was very nearly as good as the average of wheat grown after bare fallow every year. The difficulty might be that the land was being worked too shallow. At Roseworthy this year there was a field under wheat. Two years ago it had carried barley, and now it showed up as the best crop they had.

Mr. D. B. Butler (Butler) had tried barley on new mallee land, and found that it weakened the soil more than wheat, and it was not nearly so good as oats for assisting in killing the shoots.

HOW TO IMPROVE THE BUREAU.

Mr. G. G. Nicholls, Secretary to the Advisory Board, stated that at present there were 140 Branches with about 3,000 members of the Bureau scattered over the State. However, there was room for more, not only in the outlying

districts, but in the more settled and populous areas. Every farmer should be a member of the Bureau. It had taken 24 years to build the institution to what it was to-day, but there was no reason why its membership should not be doubled during the next five years. Whether or not this was effected, rested with the farmers themselves. The Advisory Board could not do it unaided. The Bureau had been a factor in the improvement of farming methods, and they should not overlook the fact that the quality of the farming affected the value of the land. Many improvements in conditions under which the farmers were working were due to the influence of the Annual Congress of the Bureau. They, however, might just as well face the facts. It was a fact that the majority of Branches were doing good work, but there were two or three which seemed to be suffering from a kind of sleeping sickness (laughter), and four or five others seemed to be in the need of some treatment for the resuscitation of the apparently dead. He trusted if any delegate had the misfortune to belong to a Branch of either of the two classes he had mentioned they would see that, so far as their particular Branch was concerned, an alteration was made.

A GOOD SECRETARY.

To have good Branches they must have good meetings, and to get good meetings they needed a good secretary. He had noticed that one Branch had given their secretary a gold medal for two years' good service. That Branch had done well. There was represented at that Congress a Branch in a district which was said by its members to be a stonethrow from Western Australia. Two years ago the average attendance at the meetings of that Branch was four, now it was 19. (Applause.) That was one result of getting a good secretary. Then they must have good papers, and if there were two sides to the question it was well to have two papers read, one from one point of view and the other the opposite. The plan of having a programme committee, which had been adopted by several Branches, was a good one. The Lameroo Branch had a report day, and it had proved such a success that it was worthy of adoption by other Branches. At the close of harvest, when the results were tabulated, the members of that Branch met and had a practical discussion in regard to them. Having got good meetings, if their Branch was not a large one, they should get more members. They should not go about it the other way, trying to get increased membership and then good meetings. If a Branch was languishing it would pay the members to devote one evening to a discussion of the position. They should not make membership too cheap, but insist on intending members attending two meetings before they were nominated. He strongly believed in each Branch holding a social meeting once in each year. Every Branch of the Agricultural Bureau should conduct some experimental work. Last year five Branches had conducted experiments with manures and varieties of wheat, and two with

grasses and fodders. On such questions the final tests had to be made on their own farms, and members, by carrying on experimental work, would not only benefit themselves but provide subjects for interesting discussions at the meetings. The Pine Forest Branch last year had, through one of its members, conducted tests as to the quantity of manure best to apply. In every case the larger quantities used showed a decided profit. That was a matter in which they were all interested, and might well take action in the way of conducting experiments. The Agricultural Bureau was an important institution with a history sufficiently grand for every member to be enthusiastic concerning it. (Applause.)

Replying to a question, Mr. Nicholls stated that so far as the Advisory Board was concerned the membership of the Branches was unlimited. The restriction as to the number of members had been removed by the Advisory Board some time ago.

EVENING SESSION.

The evening session was attended by nearly all the delegates, and a number of visitors. Mr. A. M. Dawkins presided.

SALE OF WHEAT BY LOAD OVER WEIGHBRIDGE.

The Chairman said the question of the sale of wheat by load over weighbridge had been referred by the Advisory Board to the Branches, but replies had been received from a relatively small number. It had been, therefore, decided to bring the question before Congress.

Mr. Pontifex (Paskeville) said the question of weighing wheat by the load or in bulk was not a new question, and consequently did not require much discussion. He moved—"That this Congress urge the Advisory Board of Agriculture to take any steps which may be considered necessary in order to bring about the system of weighing wheat by the load over weighbridges."

Mr. W. G. Drewett (Paskeville) seconded the motion. The matter had been discussed by his Branch. Although at first he was not in favor of the system advocated, he had been convinced by the experience of others in Victoria and elsewhere where it was in force that it would be a good thing to introduce in South Australia.

Mr. Nicholls (Secretary to the Advisory Board) said that it having been reported that in New South Wales the Railway Department catered in some way for the weighing of wheat in bulk, he had written for information to the Under Secretary of Agriculture in that State. As a result he had been informed that the New South Wales Railway Department put down weighbridges at any station where in their opinion the traffic warranted it, but they would not consider doing so unless 10,000 bags of wheat were sent away from a station in one season. In 1910 there were 100 railway stations in

South Australia from which 10,000' or more bags of wheat were trucked. He had further obtained quotations from different firms for putting down outside railway stations weighbridges capable of weighing from 10 to 12 tons. The quotations ranged from £55 to £100 per weighbridge, but the complete price would be nearer the latter figure than the former. He thought it would save time if Congress was placed in possession of those facts before the discussion on the resolution took place.

Mr. E. Hall (Strathalbyn) said that he had had personal experience of weighing wheat in bulk over weighbridges, and he was convinced that anyone who had had such experience would not favor the retention of the present system. In Victoria the weighbridges were controlled by the local councils.

A delegate pointed out that with the big loads carried to-day a 10-ton weighbridge would be of little use.

Mr. J. Smith (Hawker) opposed the motion. Even if weighbridges were provided, scales would have to be used at the stacks in order that the wheat could be tested and that not up to the standard weighed. Wheat could be received from the wagon off the scales just as quickly as it could be received from the wagon direct. Any man accustomed to weighing wheat on scales could keep two men running with the bags. He had been wheat-buying and farming for over 14 years and failed to see how the farmers would benefit by weighing wheat by the load.

Mr. J. A. Kuhlmann (Freeling) contended that if wheat was weighed over a weighbridge it would be far better for the farmers.

Mr. J. N. McCallam (Yabmana) said the question had been fully discussed by his Branch, and they favored weighing in bulk. They considered the result would be a saving in handling and of time.

Mr. J. Darley (Narriby) said the Farmers' Union were weighing wheat over the weighbridge at the present time. He had been told by one of the directors that there was a great advantage in weighing in bulk, as the farmer got more and it reduced the risk of a mistake being made in adding up the figures. A 10-ton weighbridge, however, would not be large enough.

Mr. D. Menzie (Clare) said his Branch had discussed the question and had also obtained particulars of the working of the system in New South Wales. As a result they had decided to support the motion. If weighbridges up to 15 or 20 tons were provided, placed under the supervision of the railway officials, and so much charged per ton weighed, it would, he thought, be satisfactory to everyone.

The resolution was carried by a large majority.

MAINTENANCE OF ORGANIC MATTER AND HUMUS IN WHEAT-GROWING AREAS.

The Director of Agriculture (Mr. Wm. Lowrie, M.A., B.Sc.) delivered an address on "The Importance of Adapting our Practice to Favor the

Maintenance of Organic Matter and Humus in the Wheat-growing Areas." He said—

The question of humus in the soil arises as the result of the improvement of farming methods in relation to wheat-growing that has taken place in South Australia within the last 15 or 20 years. The value of thorough fallowing, and the fact that such thorough fallowing and working of the fallows is a means of conserving the moisture to eke out a rainfall against a succeeding season, has been appreciated by so large a proportion of the men working the land that the position now is that through thorough fallowing the stubble is worth very much less than it was a few years ago. Through some of the very best country—Freeling, Roseworthy, Balaklava, Saddleworth, &c.—the feed on the stubbles is decidedly much less than it used to be, and I take it that this is not altogether due to the season, but to the fact that the thorough working for the conservation of moisture is bringing about the condition that in the year in which the land is lying out there is not that growth of herbage that there previously was, and there is consequently some greater risk of farmers who continue it having to help their land with nitrogenous manures, which is an expensive matter.

LESSENING THE RESERVE OF HUMUS.

When you are fallowing to conserve moisture and clean the land, it is worth while to do it well. It is this well-doing that seems to be lessening the capacity of the country for carrying sheep as an adjunct to the farming. Some 180 years ago, a leader of agricultural science spoke in these terms—"Tillage is manure." We have got a little farther than that. It is the means of increasing the available elements of plant food in the soils. But under our circumstances it is the means of lessening the reserve, and it is this reserve that we will have to look after. The increasing of the reserve is just where the difficulty comes in. With new, or relatively new, land, of which very large areas are being opened up just lately, such as the land now being sold in Bundaleer, Gum Creek, Booborowie, &c., some of which constituted some of the best wheat land in South Australia, the holder is justified in taking wheat as frequently as he can do so to the best advantage economically, by proceeding in a somewhat extravagant manner, burning his stubble and alternating fallow and wheat for a few years, until he has recovered his outlay. This class of land, with a reserve of humus, can stand it.

Now that wheat is at a high price, men are attacking old farm lands, and burning the stubble, and working wheat and fallow, with an occasional year laying out. These men will find that their average will contract, in spite of all the work and skill they put into the fallows. The addition of organic matter to the soil should greatly increase the yields of the Lower North wheat districts. When you are fallowing you are burning out organic matter, and this will have to be returned by applying expensive nitrogenous manures.

The organic matter in the soil in the shape of roots, leaves, &c., is not a plant food, but it has its value, and one of the features which has enabled the Lower North to go on growing wheat so well has been the growth of stinkwort. This adds organic matter to the soil and keeps the position going. The roots of the plant open up the subsoil, they decay and leave a space into which air penetrates. The aeration is deepened, but it is in the decomposition of the plants that the greatest gain is secured.

SOME RESULTS OF DECOMPOSITION.

In any decaying brought about by whatever process, whether it is moulds, fungi, or ferments, there is yielded ammonia, carbonic acid, and the residual matter like leaf mould, which we speak of as humus. The carbonic acid is of value when dissolved in the water—the moisture in our soils—because through it increasing the solvent power of the water, more of the latent elements are dissolved and made available as plant food. It is a weak acid, but its total result over thousands of acres is very appreciable indeed. The greater proportion of one of the other products, ammonia, is immediately nitrified through the action of the ferments in the soil. It is oxidised; the ammonia is converted into what chemists call nitrate—probably in our climate it combines to form nitrate of soda, nitrate of potash, or nitrate of lime—which is very valuable from the point of view of a plant food. But after all the humus is the most valuable result of the decomposition.

FARMYARD MANURE.

Were the humus appreciated at its intrinsic value we would find very few indeed of those heaps of farmyard manure scattered all over the place, and the owners not troubling to apply it to the land. Why go to the trouble of buying artificial manure of only one kind when a good many, at any rate, have a pile of farmyard manure, the bottom of which has not seen the light for 10 years. (Applause.) I know some of you will say that applying the manure is backbreaking and slow work, and is not worth doing. That is not so; it is worth doing if done in a proper way, and since you have been fallowing so thoroughly there is all the more reason for husbanding that material which, on some farms, is being wasted. But you will say that if applied to wheat land direct it makes the crop dirty. That is true; and you also say it is applying nitrogen which you do not require, which is not altogether true. If, however, an opportunity is taken of applying the farmyard manure to crops such as rape or barley for green feed, too much of it cannot be used. It can also be carted to the field which you are going to fallow and then crop for hay. If, in that case, you put on the farmyard manure before you fallow you will find the hay go over the weighbridge all the better for it, and what is more that land will show the benefit of the manure for three or four years afterwards.

THE FUNCTIONS OF HUMUS.

Let me set out the functions of the humus theoretically. The first is that it helps to increase the capacity of the soil for retaining moisture. If you have organic matter in the soil you will find that the capacity of the soil for the conservation of moisture and also its capacity of absorbing moisture from the air is increased according to the amount of organic matter in it. Organic matter has the influence of altering the physical condition of the land. It is the means of improving the fertility by making the tilth so much better. Humus makes the soil more granular. It acts somewhat in the way that lime does: it flocculates the soil. When you have the soil aggregated into granules there is less rapid evaporation from it, and consequently there is not so much moisture pumped out of it. In addition to securing a tilth, it also indirectly is the means of the soil taking in more moisture, and holding it to better advantage. The best indication of the wheat-yielding capacity of land is the grass that grows on it. The dense herbage leaves so much more organic matter in the land for the farmer to work on.* This is the reason why good grass land is a sign of good cropping capacity.

A SOURCE OF NITROGEN.

The third reason is that it is a source of much of the nitrogen in the land. In the process of working the farmer allows the atmosphere freely into the soil, and the small forms of life that are there are so much the more active on account of having favorable conditions. These are the means of fixing nitrogen from the air, and in this way provide a direct gain of nitrogen for the crops. It is a small point in favor of the organic matter that thereby the temperature of the soil is raised. One advantage is that it is a means of economising the fertilisers that you are applying. Better advantages will be secured from phosphates if the land to which they are applied contain a sufficiency of humus. The organic acids, the result of the decomposition, help in the liberation of the salts, and saves the farmer the necessity of applying manures by opening up the reserves that are in the soil.

THE ACTION OF FERMENTS.

During the past 25 years biological science has shown that there are forms of ferments living in the soils which are directly collecting nitrogen from the air. Researches have shown that there are in our soils ferments which directly utilise the nitrogen in the air—they feed upon it—and the result is that there is a fixation of nitrogen in our soils as a result of their existence. There are some that do that work through their association with clovers, but there are others—there seems no doubt about it—that in themselves have the power to fix the nitrogen of the air in our soils independently of any plant life that may be there, provided they find organic matter to give them the necessary energy. The extent to which the soils gain by the direct

assimilation of the nitrogen of the air has not been measured in South Australia. It, however, has elsewhere been estimated that the amount the soils gained in that way is something like 20lbs. to 30lbs. of nitrogen per acre per year. We may say that a crop of 20bush. would remove in the grain 25lbs. of nitrogen and in the straw 10lbs., making a total of 35lbs. If, as is done in the majority of cases, the straw is left the amount of nitrogen fixed by their special ferments will not fall far behind the rate of exhaustion through successive fallowing and wheat-growing. And it is just that fact which saves the position and explains why we can grow wheat for a succession of years without putting back into the soil organic matter, and with the direct application of phosphates only. But I want to emphasize the fact that these ferments which are the means of increasing the nitrogen in our soils require some kind of food stuff in the soils from which they can draw their energy. If the practice of fallowing, wheat-growing, and burning the stubble goes on and no organic matter is put back into the soils, no advantage is derived from those ferments because they will have no food from which to draw the energy they require to perform their work.

A DIFFICULT QUESTION.

It is necessary, then, to keep up the proportion of humus in the soils. So much for the theory; but the practice is a much more difficult question. It is a very difficult problem to know how we in South Australia are to find a rotation of cropping that will keep a sufficient supply of organic matter in our soils when, if possible, we want each year to have a third of the land in wheat. I do not think we should aim at more; but a third in wheat is necessary to earn interest on our land values. But how to have a third in wheat and not burn the stubble, have a year fallow, and have a crop there for sheep feed to keep up the humus is a problem which will take a lot of thought before it is solved. I am not going to claim to solve it. How best it can be approached is all I intend to put forth to-night. It used to be argued that if plenty of phosphates were put on the land such a wealth of herbage would result that the organic matter would be kept up. That, however, has proved not to be the case with the man who fallows clean. When the crop is cut for hay the question is not a difficult one. The stubble can be ploughed and worked down and a crop sown for feed. It may be barley, oats, rape and mustard, peas, or in some districts Italian rye grass. There is an opening for that class of machinery which will enable the farmer to get over a big block of country in the very shortest time. If the tractors which are being introduced will enable the farmer to plough, work up, and prepare for sowing about 15 or 20 acres a day, they are the implements which South Australian conditions require. These would enable the farmers to go over the stubbles at the same time that the teams are sowing the fallows. If the fallowing is done too late there is not the addition of organic matter to the soil. Rape

can be sown at the rate of from 3lbs. to 5lbs. per acre, mixed with 2lbs. or 3lbs. of mustard. It will last longer into the season if sown thinner, but in South Australia it is wanted for the purpose of putting humus into the soils, so it is necessary to sow thickly. It can be mixed with Italian rye grass. There are many places in South Australia where this should prove one of the best of green fodders, but when sowing it is necessary to exercise care in securing the best seed. The best varieties are Sutton Giant and Western-wolths. I doubt, however, whether it will succeed on anything under a 17in. rainfall. While it would be the means of increasing the stock-carrying capacity of the land, it will not be anything like the advantage to the succeeding crop that rape or peas would be. But to make a success of growing fodder crops they must not be treated less generously than are the wheat crops. If they are sown on the stubble the land should be worked and manured well. If peas are sown they will not want farmyard manure, but should be given $1\frac{1}{2}$ cwts. to 2cwts. of phosphates. For fattening lambs I find mustard with rape will avoid risk of deaths. In districts with a good rainfall Italian rye grass and peas should certainly be tried. Peas will not only fatten your lambs but will also improve your land to an extent which few other crops can approach. (Applause.)

Mr. E. J. Pearce (Whyte-Yarcowie) said that Professor Lowrie had referred to the work entailed in placing farmyard manure on the land. There was a machine in the form of a manure spreader on the market which he believed was working successfully. It cost about £40, but if several farmers bought one between them the cost would be a mere nothing compared with the advantage gained. In his district he thought Huguenot wheat would be worth trying for fodder. He had also tried rape. Rape seed was rather expensive; he had bought some from a firm in Adelaide and it had cost him nearly 1s. per pound. (A delegate—"The price is 35s. per hundredweight.") He would like to know if sorghum had any renovating effect on the soil.

Mr. Lowrie said his experience with sorghum was that the wheat sown afterwards suffered. He thought that was due to the exhaustion of moisture. He did not think growing sorghum would benefit the land to any extent.

Mr. G. Pengilly (Willunga) had found that the growth of green fodders resulted in a heavy increase in the yields from succeeding wheat crops. The effect of growing peas last year was distinctly noticeable in the crops at present.

Mr. A. Carmichael (Port Germein) desired to know whether it was advisable to cut off stubble, or whether it should be ploughed in.

Mr. Lowrie replied that if the land were to be used for peas, he would cut or burn off the stubble. But one should hesitate to burn off the stubble to put in a crop like rape. It was a pity to lose the humus. It would be better to cut and stack the stubble. If they ploughed in stubble in the North, the land would be far too open. He would not advise them to plough in the stubble in the Baroota country for the first year. It would pay better to

burn it off, and purchase nitrogenous manures, such as dried blood. The better course was to use more manure, and encourage the trefoil.

Mr. J. C. Jacobs (Angaston) desired to know whether nitrate of soda was injurious to land.

Mr. Lowrie stated that nitrate of soda was one of the means of encouraging the vigour of growth of plants. The effect was that the crop took more out of the land, because it was heavier. He would not use it in South Australia unless for the purpose of forcing something in the orchard or the garden. Dried blood was a better application to make.

A visitor desired to know the most advantageous time to feed off peas.

Professor Lowrie recommended allowing the peas to lie whilst there was plenty of other food available. They should be nearly ripe before the stock was put on to the crop, and it was not advisable to feed them off too early,

(To be continued.)

CEREAL HARVEST, 1912-13.

The Government Statist has collected preliminary reports from the collectors of statistics in the chief wheat districts of the State indicating the condition of the crops as at the 20th to the 25th September. From these reports a brief review has been compiled respecting the counties in each division of the State. The present reports indicate that the area sown for wheat will show a slight increase, and barley a good increase, and that a less area will probably be cut for hay. From a general review of the reports it would not be safe at this date to anticipate a better yield than last season, when the average was 9.25 bush., though if the areas are not visited by hot winds and the needed October rains fall and are well distributed a slightly better average yield is more than probable. He considers it too early in the season to venture upon a more definite forecast of the possible yield as so much depends upon the weather conditions to be experienced during this and next month. He will, however, issue a detailed forecast compiled from later and more complete particulars on the usual date, November 30th.

SUMMARY OF THE REPORTS AS TO THE PROSPECTS OF EACH DIVISION.

I. CENTRAL AND II. LOWER NORTH.—*Acres*.—Wheat and oats, slightly increased; barley, a large increase. *Prospective Yield*.—Favorable for a slightly better average than last season, and if good October rains fall still better.

III. UPPER NORTH.—*Acres and Prospective Yield*.—The area sown is much smaller, and an even worse average yield may be expected than last season.

IV. SOUTH-EASTERN.—*Acres*.—A large increase in the area sown is expected in wheat, barley, and oats. *Prospective Yield*.—Owing to the excellent prospects of the Pinnaroo areas the division may be expected to yield a good average.

V. WESTERN DIVISION.—*Acres and Prospective Yield*.—The area sown appears to be greater than last season, but the prospects are not nearly so good, except in county Flinders.

THE WHEAT MARKET.

The following table, giving the wheat crop of the principal countries in the world for the last three years, and an estimate, revised up to August 12th of the 1912 crop, is taken from *Broomhall's Corn Trade News* :—

PRINCIPAL COUNTRIES WHEAT CROP (IN QUARTERS OF 480LBS.).

	Preliminary Est., 1912.	1911-12.	1910-11.	1909-10.
Europe—				
France.....	40,000,000	40,000,000	31,396,000	44,900,000
Russia, 72 Govern- ments (including Siberia).....	80,000,000	63,500,000	104,009,000	97,600,000
Hungary.....	21,000,000	22,100,000	21,200,000	14,170,000
Austria.....	7,000,000	7,000,000	7,210,000	6,900,000
Croatia and Slavonia.	2,000,000	1,850,000	1,650,000	1,540,000
Bosnia & Herzegovina	300,000	300,000	300,000	330,000
Italy.....	21,000,000	24,000,000	19,200,000	23,880,000
Germany.....	16,500,000	17,500,000	17,740,000	17,252,000
Spain.....	17,000,000	18,682,000	17,000,000	18,000,000
Portugal.....	700,000	1,200,000	1,150,000	900,000
Roumania.....	9,000,000	11,400,000	13,400,000	7,300,000
Bulgaria & Roumelia	7,000,000	8,500,000	7,074,000	4,562,000
Servia.....	1,700,000	1,800,000	1,652,000	1,744,000
Greece.....	500,000	400,000	300,000	600,000
United Kingdom...	7,000,000	7,987,000	7,279,000	7,900,000
Belgium.....	1,500,000	1,800,000	1,500,000	1,653,000
Holland.....	500,000	500,000	530,000	630,000
Switzerland.....	500,000	440,000	400,000	445,000
Sweden.....	900,000	1,037,000	880,000	800,000
Denmark.....	500,000	500,000	590,000	489,000
Norway.....	30,000	30,000	38,000	38,000
Cyprus and Malta..	300,000	300,000	300,000	360,000
Total Europe...	234,930,000	230,826,000	254,798,000	251,993,000
America—				
U.S.A.....	86,000,000	77,700,000	79,400,000	92,000,000
Canada.....	28,000,000	27,000,000	18,750,000	20,840,000
Argentina.....	25,000,000	21,300,000	17,000,000	16,400,000
Uruguay.....	1,000,000	1,200,000	1,125,000	1,200,000
Chili.....	1,700,000	1,750,000	2,500,000	2,500,000
Mexico.....	700,000	700,000	1,150,000	1,150,000
Total America....	142,400,000	129,650,000	119,925,000	134,090,000
Africa.....	4,500,000	5,600,000	5,700,000	5,080,000
Asia.....	49,000,000	49,500,000	49,260,000	47,494,000
Australasia—				
Commonwealth.....	10,100,000	9,420,000	12,050,000	11,450,000
New Zealand.....	1,000,000	1,000,000	1,100,000	1,100,000
Total Australasia..	11,100,000	10,420,000	13,150,000	12,550,000
Total world's crop—				
Quarters.....	441,930,000	425,996,000	442,833,000	451,207,000
Bushels.....	3,535,440,000	3,407,968,000	3,540,266,000	3,609,656,000
Quintals.....	962,081,600	927,393,300	964,047,400	982,277,630

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Sept. 2	—	4/1	4/2½ to 4/3	4/2½ to 4/3
3	Quiet; Liverpool steadily held, not active	Do.	Do.	Do.
4	Very dull; Liverpool steady, but quiet	Do.	Do.	Do.
5	Dull, with easier tendency	4/- to 4/1	4/2 to 4/2½	4/2 to 4/2½
6	Very dull; Liverpool steady, but quiet	Do.	Do.	Do.
7	Do.	Do.	Do.	Do.
9	—	4/1	Do.	Do.
10	Dull and neglected	Do.	Do.	Do.
11	Quiet; Liverpool steady, quiet; Australian off coast, 4/11½	Do.	4/2½ to 4/3	4/2½ to 4/3
12	Steady, but quiet	Do.	Do.	Do.
13	Do.	Do.	Do.	Do.
14	Firm and more inquiry; Australian off coast 5/0½; Liverpool steady, but quiet	Do.	Do.	Do.
16	—	Do.	Do.	Do.
17	Very firm, better demand; Liverpool firm, but inactive	Do.	4/3 to 4/3½	4/3 to 4/3½
18	Steady, but quiet	Do.	4/3	4/3
19	Firm; Liverpool steady, but quiet	Do.	4/3 to 4/3½	4/3 to 4/3½
20	Do.	Do.	4/2½ to 4/3	4/2½ to 4/3
21	Dull, with easier tendency; Liverpool held at late rates, but no demand	Do.	Do.	Do.
23	—	Do.	Do.	Do.
24	Dull, with easier tendency	Do.	Do.	Do.
25	Do.	Do.	Do.	Do.
26	Dull	Do.	Do.	Do.
27	No demand; Liverpool quiet	Do.	Do.	Do.
28	Quiet; Liverpool steady, but quiet; Australian arrive early October, 5/0½	Do.	Do.	Do.
30	—	Do.	Do.	Do.
October 1	Steady, but quiet	Do.	Do.	Do.
2	Do.	Do.	Do.	Do.
3	Firm; Liverpool firmly held at full rates, but inactive	Do.	Do.	Do.
4	Firm, but quiet	Do.	Do.	Do.

STEAMER FREIGHTS.—(October 3rd)—Steamers from South Australia to United Kingdom-Continent, full cargo rates (nominal), old wheat, 37s. 6d. per ton (1s. 0½d. per bush.); new crop, 40s. per ton (1s. 1d. per bush.). Parcels, Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent (Dec.-Jan.), 37s. 6d. per ton (1s. 0½d. per bush.); old wheat, 30s. per ton (9½d. per bush.); to South Africa (Sept.-Oct.), 25s. per ton (8d. per bush.); new season, 28s. 9d. per ton (9½d. per bush.).

RAINFALL TABLE.

The following table shows the rainfall for September, 1912, at the undermentioned stations, also the average total rainfall for the first nine months in the year, and the total for the nine months of 1912 and 1911 respectively :—

Station.	For Sept., 1912.	A'v'ge. to End Sept.	To End Sept., 1912.	To End Sept., 1911.	Station.	For Sept., 1912.	A'v'ge. to End Sept.	To End Sept., 1912.	To End Sept., 1911.
Adelaide	2.64	16.76	14.96	13.60	Hamley Bridge	2.72	13.12	10.63	11.71
Hawker	0.35	9.38	8.07	7.49	Kapunda ...	4.03	15.88	13.36	12.60
Cradock	0.18	8.40	5.30	6.48	Freeling ...	3.20	14.23	12.94	11.93
Wilson	0.21	9.09	8.01	6.08	Stockwell ...	4.78	16.29	16.11	13.82
Gordon	0.36	6.77	6.71	5.97	Nuriootpa ..	4.06	17.11	15.44	11.67
Quorn	0.93	10.74	12.09	6.97	Angaston ...	5.08	17.47	18.78	18.28
Port Augusta	0.73	7.10	7.71	7.12	Tanunda ...	6.48	17.85	22.76	19.02
Port Germein	1.07	9.65	8.02	8.62	Lyndoch ...	4.63	18.62	17.27	15.19
Port Pirie ..	1.19	10.13	7.71	11.00	Mallala	2.65	13.43	11.08	12.99
Crystal Brook	1.27	11.89	10.76	12.81	Roseworthy ...	2.22	13.93	10.82	10.78
Pt. Broughton	0.80	11.40	9.72	11.12	Gawler	3.27	15.58	12.84	11.46
Bute	1.30	12.35	9.57	14.13	Smithfield ...	2.54	13.19	11.68	12.07
Hammond ..	0.72	8.29	7.45	10.92	Two Wells ..	2.02	14.63	9.35	10.21
Bruce	0.60	6.90	8.56	5.64	Virginia	2.93	14.18	11.74	10.90
Wilmington ..	1.00	14.12	14.71	13.15	Salisbury ...	3.88	14.96	13.88	14.43
Melrose	0.95	18.43	15.42	14.44	Teatree Gully	4.47	22.62	19.80	16.65
Boolearoo Cntr	0.85	12.41	8.86	8.93	Magill	3.35	20.91	17.37	16.64
Wirrabara...	1.67	14.84	13.70	11.07	Mitcham ...	3.46	21.92	15.18	15.73
Appila	1.24	11.44	13.61	10.57	Crafrers	7.74	38.48	31.63	35.44
Laura	1.69	13.89	10.82	12.76	Clarendon ..	5.43	33.17	21.08	25.43
Caltowie	1.62	13.28	10.03	13.21	Morphett Vale	3.42	19.18	14.56	17.46
Jamestown ..	1.87	13.30	13.95	14.64	Noarlunga ...	4.07	16.71	14.82	17.32
Gladstone ..	1.75	12.26	9.91	12.74	Willunga ...	4.70	21.60	17.50	22.71
Georgetown ..	2.31	14.46	13.00	13.70	Aldinga	3.29	16.84	13.19	15.72
Narridy	1.49	13.43	10.94	13.92	Normanville	4.10	17.27	13.43	16.16
Redhill	1.82	13.14	12.32	11.83	Yankalilla...	5.12	18.62	16.86	20.32
Koolunga ...	1.92	12.32	11.11	11.36	Endunda	3.54	13.42	13.26	13.07
Carrieton ...	0.71	9.12	8.17	8.48	Sutherlands ..	1.54	—	8.42	7.73
Eurelia	0.88	10.09	9.59	8.77	Truro	4.83	15.58	18.69	14.04
Johnsburg ..	0.48	7.41	8.16	7.04	Palmer	4.25	—	13.59	10.53
Orroroo	0.82	10.47	8.87	7.51	Mt. Pleasant.	7.25	22.35	20.17	18.59
Black Rock ..	0.87	9.17	8.60	8.15	Blumberg ...	6.56	24.62	20.79	19.75
Petersburg ..	1.10	9.87	9.73	9.30	Gumeracha ...	7.20	27.42	23.94	22.59
Yongala	1.40	10.49	8.96	10.59	Lobethal ...	7.54	29.96	23.56	24.43
Terowie	1.23	10.22	8.65	9.10	Woodside	9.52	26.08	25.73	24.20
Yarcowie ...	1.44	10.53	9.77	10.75	Hahndorf ...	7.89	29.43	21.23	28.36
Hallett	1.91	12.80	10.79	11.91	Nairne	6.80	23.77	19.32	24.27
Mount Bryan	2.21	12.65	12.00	10.88	Mount Barker	7.62	25.65	22.01	24.42
Burra	2.76	14.20	14.07	12.96	Echunga ...	6.31	26.97	21.91	27.47
Snowtown...	1.39	12.54	10.43	9.85	Macclesfield .	6.82	25.09	26.26	24.46
Brinkworth ..	1.66	11.67	11.40	12.02	Meadows ...	7.76	29.15	24.83	29.17
Blyth	1.72	12.91	9.91	13.54	Strathalbyn .	4.00	15.56	13.87	17.15
Clare	2.82	19.69	15.36	18.67	Callington ...	2.25	12.86	8.41	10.96
Mintaro Cntrl.	3.29	17.75	13.19	16.80	Langh'rne's B.	1.77	12.29	8.22	10.59
Watervale...	3.59	22.19	15.86	20.03	Milang	1.69	13.68	7.86	9.21
Auburn	3.06	19.53	12.17	17.73	Walleroo ...	1.29	11.29	12.24	13.83
Manoora ...	2.71	14.47	10.25	12.20	Kadina	1.49	13.13	11.55	13.13
Hoyleton ...	2.11	14.66	8.89	13.44	Moonta	1.81	12.44	11.04	11.88
Balaklava ..	1.91	12.68	8.28	12.16	Green's Plains	1.51	12.80	9.60	9.88
Pt. Wakefield	1.83	10.59	8.55	13.91	Maitland ...	2.75	16.58	12.36	16.60
Saddleworth	2.95	16.10	10.89	12.58	Ardrossan ..	2.37	11.35	9.78	10.96
Marrabel ...	2.81	14.34	9.87	9.87	Pt. Victoria .	2.16	12.50	10.70	13.58
Riverton ...	3.40	16.47	11.49	14.83	Curramulka .	2.39	15.50	10.93	13.55
Tarlee	3.36	13.87	11.75	11.43	Minlaton ...	2.32	14.60	11.00	12.88
Stockport ..	2.80	12.80	11.03	10.27	Stansbury ..	2.93	14.04	12.27	14.20

RAINFALL TABLE—*continued.*

Station.	For Sept., 1912.	Av'ge. to End Sept.	To End Sept., 1912.	To End Sept., 1911.	Station.	For Sept., 1912.	Av'ge. to End Sept.	To End Sept., 1912.	To End Sept., 1911.
Warooka ...	2.96	14.01	10.50	17.24	Bordertown .	3.86	15.65	12.17	16.48
Yorke town .	2.25	14.72	11.30	13.90	Wolseley ...	4.60	13.71	12.45	18.01
Edithburgh .	2.41	13.69	10.72	12.62	Frances	5.34	15.74	15.67	19.40
Fowler's Bay	0.72	10.51	8.97	11.71	Naracoorte ..	6.61	17.89	18.13	22.50
Streaky Bay	1.88	13.28	13.43	14.38	Lucindale ..	7.44	18.81	19.21	24.56
Pt. Elliston .	1.66	14.00	13.66	16.71	Penola	5.40	21.44	20.17	26.18
Pt. Lincoln..	2.93	17.11	17.41	15.26	Millicent ...	4.60	24.89	21.66	30.86
Cowell	0.99	9.49	8.16	8.79	Mt. Gambier.	6.46	25.53	23.79	34.86
Queenscliffe .	2.52	15.57	14.33	—	Wellington .	2.03	11.90	9.07	15.04
Port Elliot .	3.81	17.12	13.73	14.47	Murray Brdg.	2.24	11.16	8.29	17.78
Goolwa	3.82	14.62	14.38	15.59	Mannum ...	1.31	9.39	5.68	15.00
Meningie ...	3.61	15.64	12.55	12.77	Morgan	0.48	6.66	6.36	11.80
Kingston....	6.10	20.47	25.95	19.13	Overland Crnr.	0.83	8.37	6.96	15.64
Robe	3.59	20.91	16.39	19.91	Renmark ...	0.96	7.73	6.57	13.20
Beachport... Coonalpyn ..	3.90 3.22	22.89 14.07	18.52 12.54	25.45 12.25	Lameroo ...	2.36	—	12.26	15.53

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of over 6,000 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Export Department reports on October 1st—

BUTTER.

The supply of cream is steadily increasing, showing a very marked improvement on last month. There is a great demand for butter, the present prices being—Superfine, 1s. 0½d. per pound; pure creamery, 11½d. per pound.

A. W. Sandford & Co., Limited, report on October 1st—

BUTTER.—The nice rains experienced in the early part of September somewhat checked the increase in supplies of butter and cream, but towards the end of the month much heavier quantities came forward, and values showed a slight easing. Best factory and creamery, fresh in prints, sold at from 1s. to 1s. 1d.; choice separators and dairies, 10d. to 11d.; store and collectors, 9½d. to 9¾d. per lb.

EGGS.—Prices have remained stationary throughout the month and were considerably higher than ruled at the corresponding time last year. Heavy over-sea orders, coupled with extensive local trade, cleared all offering at 9½d. per dozen for hen, and duck 10d.

CHEESE.—Considering the cold weather very heavy business has been put through, both for local and export. Quotations—New make, for large to loaf, 7½d. to 8d. per lb.; matured 10½d. to 11½d. per lb.

BACON AND HAMS.—The high prices ruling have somewhat checked consumption, but as bacon stocks are light, values have not been affected. Best factory cured sides, 10d. to 10½d. per lb.; hams, 11d. to 1s. per lb.

HONEY.—The first of the new season's honey is now on the market, but so far only small lots have come to hand. These are finding ready buyers at 3½d. per lb. for prime clear extracted; second grades are slow of sale at 1½d. to 2d.; beeswax is very saleable at 1s. 3d.

ALMONDS.—Demand has been somewhat slow, owing to buyers having already secured their requirements, but kernels are in good request. Brandis are selling at 5½d.; mixed soft shells, 5d.; kernels, 1s. 3d. per lb.

LIVE POULTRY.—The catalogues during September have not been nearly equal to trade requirements, consequently buyers have had to bid keenly for all offering. Good table roosters realised 3s. 6d. to 4s. each; hens and cockerels, 2s. 6d. to 3s.; ducks, 3s. to 3s. 6d.; geese, 4s. to 5s.; pigeons, 8d. to 9d.; turkeys, 8d. to 11d. per lb. live weight for fair to prime table sorts.

CARCASS MEAT.—Brisk business has been experienced with very tall rates ruling, owing to the scarcity of the live hog. Bright handy size shop porkers brought 6½d. to 7d. per lb.; good baconers, 6d. to 6½d.; heavy and light sorts, 3d. to 4d.; nice dairy veal, 3d. to 3½d.; medium quality, 1½d. to 2d.

POTATOES AND ONIONS.—There is no alteration to report in the potato and onion markets, the high prices checking consumption, but as there is a decided shortage no lowering is anticipated. Present quotations—Potatoes, £10 10s. to £11 per ton on trucks, Gambier; onions, £14 to £21 per ton on trucks, Gambier.

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Oct.	Nov.			Oct.	Nov.
Amyton	351	—	—	Kadina	*	22	19
Angaston	*	26	23	Kalangadoo	*	12	9
Appila-Yarrowie	*	—	—	Kanmantoo	383	26	23
Arden Vale & Wyacca ..	352	—	—	Keith	†	26	23
Arthurton	366	—	—	Kingscote	†	1	5
Balaklava	*	—	—	Kingston	†	26	30
Beetaloo Valley	*	—	—	Koppio	†	24	21
Belalie North	†	26	23	Kybybolite	*	24	21
Berri	375	26	23	Lameroo	*	—	—
Blyth	††	19	16	Leighton	357	—	—
Bowhill	*	—	—	Lipson	*	—	—
Bowmans	*	24	21	Longwood	383	23	20
Burra	*	—	—	Lucindale	*	26	30
Bute	†	—	—	Lyndoch	*	24	—
Butler	*	—	—	MacGillivray	383	—	—
Caltowie	*	26	23	Maitland	*	3	7
Carrieton	*	24	21	Mallala	*	7	4
Cherry Gardens	378	22	19	Mangalo	*	—	—
Clare	†	25	22	Mannum	*	26	30
Clarendon	378	21	25	Meadows	384	—	—
Colton	*	26	23	Meningie	†	26	23
Coomooroo	*	21	25	Millicent	*	8	12
Coonalpyn	374	—	—	Miltalie	*	26	23
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Cradock	*	—	—	Mitchell	*	26	23
Crystal Brook	355	—	—	Monarto South	*	—	—
Davenport	*	—	—	Monteith	*	—	—
Dawson	*	—	—	Moonta	†	—	—
Dingabledinga	*	11	8	Moorlands	*	—	—
Dowlingville	*	—	—	Morchard	352	—	—
Elbow Hill	370	—	—	Morgan	*	26	—
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Forster	*	19	23	Mount Barker	*	24	21
Frances	*	25	22	Mount Bryan	*	26	23
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Geranium	*	26	30	Mundoora	*	—	—
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Glencoe	*	—	—	Naracoorte	391	—	—
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* No report received during the month of Sept.

† Only formal business transacted at the last meeting.

REPORTS OF CONGRESS.

As it would involve much repetition to print reports of delegates concerning Congress, these will only be published if discussion takes place which is likely to be of interest and value to other readers. Other reports will be classed as formal if this is the only business dealt with.—[ED.]



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

November 13th, December 11th.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, August 27.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O'Donoghue (chair), S. Thomas, R. Brown, D. V. Aitkin, T. Ward, H. K. Gum, A. Crisp (Hon. Sec.), and one visitor.

CULTIVATION OF THE SOIL.—The following paper on this subject was contributed by Mr. S. Thomas:—"On the cultivation of the soil chiefly depends the success or failure of the season's crop. The object of cultivation is threefold, viz., (a) conservation of soil moisture, (b) destruction of weeds, and (c) the improvement of the soil. The most important problem in this district is how to make the surplus rains of the wet seasons help us out in a dry season. When we have solved this difficulty our troubles will be very materially lightened. The most important factor in attaining this is to start fallowing after the first rain after harvest operations. Our annual rainfall here is 12 in., and if we want the best results we will not be content to start fallowing after the greater part of it has fallen and run to waste, as is the case if we delay fallowing until after seeding is over, as that means that two-thirds of the year's rainfall is lost to the land. The position is this, that rain that falls on unploughed land will not improve that land at all. As an instance in proof of this: I fallowed some land many years ago a few days before a heavy fall of rain and when the land was dry, and ploughed some near it a few days after the rain, while it was still fairly moist and it turned over nicely. The first, that which was ploughed dry, yielded more than double the crop of that ploughed later while moist, proving conclusively that the rain that falls previously to ploughing does not benefit the soil to any appreciable extent, and whether land is ploughed when moist or dry is of less importance than that it should be ploughed early. Before the advent of the drill and manure, when most of us were finished seeding by the middle of April, it was permissible to start fallowing as soon as seeding operations were over; but now, when seeding is continued right through June, this is altogether too late. If we do not start until late in the season the first month may prove too wet; then perhaps we get a good fortnight's work in; then it is too dry, and the season is gone before we have done one half of that which we intended, as was evidenced in the numerous unfinished paddocks last year in this district. This year I started fallowing fairly early; one team was put on fallowing while the other was working the land preparatory to seeding. It is by far the best plan to get most of the fallowing done in the autumn or early winter, so that we have the land open to receive all or nearly all of the winter's rains. Land ploughed in March, April, and May this year has had bin. of rain on it since it was ploughed. This was lost to land ploughed late in August or September, and the former is therefore fortified against a dry spell to such an extent that is quite impossible with any land that may be ploughed later. We need to remember that land must first receive the rain that falls before we can work it beneficially to retain the moisture. If we fallow too late our trouble in working land to retain the moisture that never entered the soil is wasted. Further, the working of the land to kill weeds will need to be done late in the season, and it is apt to prove injurious to the soil on account of its extreme dryness. I prefer leaving the fallow rough and open through

the wettest part of the winter, say, until the end of July, as the more surface exposed to the air, warmth, and sunlight the better the results. By the end of July all fallowing should be finished, leaving the team free to work the fallow in order to retain the moisture in the soil. Harrowing should be first done in the same direction as the land is ploughed, and afterwards across. This will break the land down fairly level and firmly, and destroy most of the weeds, especially if scarifier harrows are used. If found necessary I would use the skim plough to destroy weeds. If fallowed early land can be ploughed deeper with benefit, but 4in. on the clayey soils and a little shallower on the light soils is usually sufficient. Work the fallow after every rain right through the summer, except perhaps in the harvest season." In discussing the paper Mr. Brown disagreed with the practice of ploughing the ground when dry. The Hon. Secretary would scarify the land to be fallowed before seeding instead of ploughing it. This would encourage a quicker germination of weeds and rubbish after rain, and the land would plough up in a nice mellow condition. Members agreed that it was advisable to break the surface of the soil in order to allow it taking in moisture.

Arden Vale and Wyacca, August 29.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. J. H. Willis (chair), J. Absalom, W. Fricker, H. Liebich, M. Eckert, C. Starr, E. W., J., and T. Klingberg, R. Paynter, O. E. Hannemann (Hon. Sec.), and five visitors.

RABBIT-PROOF FENCES.—The Chairman dealt with the subject of the construction of wire netting fences over waterways. The best plan was to put strong strainers above the high-water mark on either side of the course, strut them securely, strain the wires on each side, and then staple on the netting. A wire should be run through the tops of the strainers across the creek, well up out of the floodwaters, and to this two widths of netting laced together should be hung. Care should be taken that no gap was left between the netting and the strainers. Not more than 6in. of the netting should lie in the bed of the creek with the flap down stream. On to this stones should be placed. After the floodwaters had passed all that was necessary was to replace the stones and adjust the netting.

HAY.—Mr. M. Eckert contributed a paper, in which he recommended farmers to cut more of their crops for hay than had been done in the past. Wheat intended for hay should be an early variety that would provide a good color in the chaff. Dart's Imperial was a good sort to sow on clean land, but as it was a slow grower the wild oats got ahead of it where the land was at all dirty. Where it was intended to sell chaff the farmer was advised to use engine power for his chaffcutter. A 5-h.p. engine would supply the necessary strength.

Morchard, August 31.

(Average annual rainfall, 11½in.)

PRESENT.—Messrs. Scriven (chair), W. Toop, G. O. Rafferty, E. J. Kitto, R. Jasper, W. A. Toop, H. Kupke, J. Waters, E. D. Kirkland, H. A. Toop, W. Munro, B. S. McCallum (Hon. Sec.), and one visitor.

MARKETING WHEAT.—In a paper dealing with this subject Mr. Rafferty drew attention to the fact that the wheatgrower was not receiving satisfactory treatment at the hands of the merchants. He expressed the view that the Government should undertake the marketing of this product. The prices which the farmer had to pay for bran and pollard were crippling the dairying, pig-raising, and poultry industries. These, considering the price which the farmer secured for his grain, should be much lower.

Mount Remarkable, September 6.

(Average annual rainfall, 21in.)

PRESENT.—Messrs. L. A. Bauer (chair), J. McIntosh, T. H. Casley, N. S. Giles, M. G. Giles, E. M. Willington, E. B. Andrews, and H. H. Davies (Hon. Sec.).

ANNUAL REPORT.—The annual report of the operations of the Branch during the year just closed was read by the Hon. Secretary. Mention was made of the success which had attended the efforts of the Bureau in bringing together delegates from different parts

of the district with the idea of discussing the proposed water schemes in connection with the Willochra. An effort has also been made by members to form a vigilance committee, with a view to improving the township.

Wepowle, August 27.

(Average annual rainfall, 12in.)

PRESENT.—**MESSRS.** J. Orrock (chair), G. Goss, C. Knauerhase, J. Chrystall, M. M. Irvine, T. F. Orrock (Hon. Sec.).

THE SHOP ON THE FARM.—Mr. J. Orrock read a paper on this subject, in which he stated that with a well-equipped blacksmith's shop on the homestead time and money could be saved. It often required longer to take work to the local blacksmith than it did for the farmer to do it himself. A good forge, an anvil, tongs, hammer, vice, drilling machine, punches, and hot and cold chisels were practically all the tools necessary. The tines or teeth of an old horseshoe made excellent shoes. He had forged shoes from the springs of an old buggy, and they had lasted almost twice as long as iron. A farmer could also make split links in his shop. When welding links in old chains, the ends should be made thinner in order to fit the worn links. With stocks and dies bolts of the length required could be made. In the discussion which followed members agreed that much time and expense could be saved if a blacksmith's shop and a few tools were on the farm.

Willowie, August 27.

PRESENT.—**MESSRS.** T. Hawke (chair), E. S. Bristow, A. R. Wilkin, F. Richter, L. Hughes, D. L., S., and J. McCallum, E. J. Kentish, A. W. Howard, S. C. Greig, W. P. Foulis (Hon. Sec.), and one visitor.

FARM TOOLS.—Mr. E. J. Kentish contributed the following paper on this subject:—"The man on the land is primarily a farmer, and has to do with tilling the land, tending and rearing stock of all descriptions. These occupations make such demands on his time that it frequently happens that it is best for him to leave work for tradesmen as much as possible. Often, however, the trouble of going to the shop for his needs, together with the expense, makes it advisable that many things should be done at home. Some think a forge a very necessary part of a farmer's outfit. My opinion is that it is not of much value unless there are tools at hand and reasonable accommodation is available. The expenditure involved will only be justified where the individual need requires it. I have found it very necessary on occasions to shoe horses; not that it is cheaper, but it sometimes happens when ploughing or working a stony paddock that a horse will show tender. The animal can be shod at home twice over in the time that it would take in going to and from the shop. When horses are usually worked barefooted it is better not to burn the hoof much, as it stands better when the shoe is removed if it has been put on cold. Some good tools for hoof-cutting and shoeing should be on most farms. A strong vice is a necessary tool, and a hand-screwing apparatus is very useful. I have found the hand drill a simple device for boring iron. Every farmer needs a good supply of wrenches and spanners of all sizes, and a strong grip wrench or pipe wrench is a very necessary part of his outfit. Wood and iron chisels are in considerable demand, and should be kept in good order. Wood rasps and files may be needed at any time. So also with bits of all sizes from jin. up to lin. These should be at hand at a moment's notice. Tools should be kept in order. Where different tools are constantly being taken to the field for use they are apt to be lost." In discussing the subject, Mr. S. McCallum said the farmer should procure a few tools for his workshop, which Mr. L. Hughes thought should be situated handy to the dwelling-house. Mr. T. Hawke thought the farmer should devote all his time to the land. In the majority of cases where he tried to effect repairs that should be in the hands of the tradesman, the result was far from satisfactory. Members generally agreed that it was advisable for every farmer to keep a stock of useful tools, but it was undesirable to attempt repairs that required the attention of a skilled tradesman.

FENCING.—Mr. E. J. Kentish dealt with this subject in a paper as follows:—"In this and many other parts of this State posts are very scarce, and carriage is a big item where wooden posts have to be carted 15 or 20 miles. If all iron posts are used the fence is not so firm. I have constructed a fence of the following dimensions, and would recommend it as serviceable, cheap, and easily constructed for sheep and great stock:—Place one large split red gum or box post to the chain with three T iron posts and four droppers

between, making in all eight supports to the chain. Put strainers 7ohns. apart, 2ft. 6in. in the ground for line strainers, 3ft. in the ground for corner and gate posts, and 18in. to 20in. for ordinary posts. The first wire should be 7½in. from the ground, the next three 5½in. apart, and the remainder 6in., 8in., and 10in. respectively. For the top wire use 12 x 3 barb, then one plain wire and one 14 x 3 barb, making two barbs and five plain wires. It is advisable to put in an extra wire and make the fence high enough to resist great cattle, and to make a good sheep-proof fence. It cannot be more than 3ft. 3in. or 3ft. 6in. in height with six wires. This is not high enough for cattle, as they jump over and knock the fence about, and young horses will gallop over it, and in a good many cases ruin themselves. If a fence is 4ft. high they will not get their heads over so easily. Posts well strained and rammed do not require to be buried to any great depth." Mr. Kentish, in discussing the question, said 4ft. was unnecessarily high for fencing. Iron posts would be found cheaper than wooden. Mr. Howard mentioned that where there was a danger of fire the use of iron posts was advisable. Mr. J. McCallum preferred the bottom wire of the fence placed 6in. above the ground, a plain wire 7in. higher, and then two barbed wires 10in. apart with the bottom one 8in. above the next directly below. Mr. S. McCallum said that where the droppers of a fence were fixed or tied the wires remained very much tighter. Mr. Hawke thought trouble would be experienced with sheep crawling under if the bottom wire were put more than 6in. above the ground. Wooden posts should always be charred, as this preserved them against the ravages of white ants. Mr. L. McCallum said that drift would soon accumulate and prevent sheep crawling under the fences. Half a chain was quite far enough apart for wooden posts, which could be protected from white ants by the application of tar.

Wilmington, August 28.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. J. Hannagan (chair), Litchfield, Noll, D. and S. George, Farrell, Hill, Slee, Forbes, Benier, Zimmermann, J., W., and G. Schuppan, A. R. and E. J. Gloede, and B. Jericho (Hon. Sec.).

WEEDS ON FALLOW.—Mr. E. J. Gloede read the following short paper on this subject:—
 "The destruction of weeds on fallow is best carried out when the soil is in a dry state, so that all disturbed plants die off. Early fallowing gives the farmer a chance to properly work his land, and the soil does not set so hard. Stinkwort is never so bad on early as on late fallow. For several years I have gone to much trouble to clear my paddocks of 'Three-corner Jack' and stinkwort. This year the latter got too strong a hold, as seeds were blown from places where nothing had been done to destroy this weed. Three-corner Jacks and couch grass seem hard to eradicate. I tried to destroy this grass by ploughing deep, but it spread worse than before. Although I picked the Three-corner Jacks where they grew, they seem to come up in the same places." In the discussion which followed, several members pointed out that stinkwort was worse on early than on late fallow. Mr. Gloede stated that sheep would sometimes feed on the leaves of Three-corner Jacks. The only method of eradicating them was to either hand-pick them or dig them out with hoes.

Wilmington, September 25.¹

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. J. Hannagan (chair), D. George, Noll, J. Schuppan, Zimmermann, Hill, G. Schuppan, Forbes, Benier, Litchfield, A. R. Gloede, B. Jericho (Hon. Sec.).

SOUTH AUSTRALIAN WHEAT INDUSTRY.—The Hon. Secretary contributed a paper respecting wheat-growing in this State. He referred to the improvements that had been made in the selection of varieties, and stated that from a miller's point of view, while improvements had been made, the gluten content was still low as compared with the grain from other parts of the world. He urged the necessity for careful and constant experiment on the part of farmers, that they might secure varieties best suited to the conditions prevailing in their district. He favored the building of railways in advance of the settlement of the land. The aim should be to grow the best quality of grain with due consideration to yielding capacity. There was plenty of room for expansion in the production of wheat, and farmers could, with confidence, take the fullest advantage of the favorable climatic and other conditions, in the assurance that there would always be a market for their produce.

Wirrabara, August 24.

(Average annual rainfall, 30in.)

PRESENT.—**Messrs.** E. J. Stevens (chair), A. E. Stott, G. Hollett, F. T. Jettner, P. J. Curnow, P. R. Hoskins, P. Lawson, H. Lawson, C. Hollett, W. H. Stevens, J. F. Pitman, W. Marner, E. Hollett, and A. R. Woodlands (Hon. Sec.).

FARM MANAGEMENT.—**Mr.** J. F. Jettner read the following paper:—"Good management on the farm is of vital importance, for the greater number of failures may be traced to bad management. Farming, as a business, requires much forethought and close personal application. Therefore it is necessary that every farmer should make a special study of his farm, and everything that is needful thereon. In the first place it is important to be careful in all financial ventures. One needs to go carefully into the cost of implements, &c., required each season, and then consider what it is possible to do without. Buy first class implements, for waste, bad quality of work, and lost time are the chief leakages which have to be met. The question of labor is very important. Always give preference to a competent hand, and at the same time remember he is worth the highest wages circumstances will permit. When improvements are required the aim should be to construct them to serve as many purposes as possible, and at the same time convenience and comfort should not be neglected. The material used should be durable. Implements should be kept under cover. This will add to their length of service. A liberal allowance of paint, particularly with regard to woodwork, is necessary. Farm horses deserve the best attention and should be kept in good condition on plenty of good chaffed hay. It is well to hold a good stack of hay in reserve. The preparation of the land for cropping is of great importance. If it is not well fallowed, cultivated, and harrowed, and all weeds kept down, the chances are against a good result at harvest time. The urgency of dispatch of all work with regard to fallowing, seeding, and harvesting accounts for the difference between success and failure. Sheep, cattle, pigs, and poultry, if properly managed, will add materially to the returns of the farm. Wool, lambs, and mutton can only be produced successfully where experience and careful judgment prevail. The safest line to follow is to hold plenty of feed in reserve. The best time to reduce the flock is in August, in order to allow the grass to seed. Re-stock at the end of the summer. A few lambs of good quality are worth more than double their number of miserable stunted weeds. Quality means everything. Cows should only be kept for the supply of the farm. Poultry in limited numbers only should be kept. The water supply should not be neglected, and, if possible, there should be water in every paddock. Wells are preferable. It is important that stock have free access to water if they are to keep their condition during the summer months. The time lost driving them to water and the destruction of feed is a serious loss that is not always fully recognised. There are many difficulties that the most thoughtful and careful farmer has to contend with, but at the same time his aim should be to make his occupation as pleasant as possible." During the discussion which followed the reading of the paper, it was mentioned that a mixture of kerosine and tar in equal parts made an excellent paint for ironwork. Wooden wheels were best treated with boiled linseed oil.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Crystal Brook, August 24.

(Average annual rainfall, 15in.)

PRESENT.—**Messrs.** M. P. Pavy (chair), W. J. Venning, A. Miell, G. Miell, R. R. Shaw, B. Flavell, G. A. Solomon, J. Pridham, J. Teakle, R. Heaslip, W. Hutchison, A. E. S. Clarke, W. Carmichael, A. E. Cooke, G. Davidson, B. Weston, J. H. Shearer, J. Duffield, A. MacDonald, W. W. Robinson (Hon. Sec.), and two visitors.

FRICTION.—**Mr.** Shaw read the following paper:—"No machinery, however delicately made, is entirely frictionless where there are moving parts. This is reduced to a certain extent by applying a coat of oil between the two bearing surfaces, which prevents the metals coming into contact. Undue or excess of friction means loss of power. Farming implements that have quickly revolving parts, such as harvesters and binders, should

have their spindle bearings in proper alignment, otherwise there will be friction requiring a greater draught, also a greater wear on the bearings. It is a great mistake for farmers to use so-called cheap lubricating oils for their implements; they are dear at any price, as they gum up and play havoc with the bearings, cause a greater draught on the horses, and a more frequent visit to the machinery depot for spare parts. When using these implements it will be found advantageous to go over all the bearings and moving parts every few days with kerosine instead of oil. This will clean the bearings and wash out the old oil; then shortly after give a supply of fresh lubricating oil. The difference in draught will be surprising; but do not run too long on the kerosine before oiling all round. Farmers would find it a great saving if they made themselves conversant with the use of antifriction metal. It goes under several names, such as white and Babbitts metal. By its use a lot of old worn bearings can be run and made as good, and very often better than when new. It is fairly easy to run the bearings, and full instructions as to its use can be obtained from the agents. Friction is caused by vehicle wheels not being set in alignment—mostly spoken of as 'axles not being properly set.' There is a great difference in the running of vehicles. Some wagons will take the same load with six horses as others will take with seven horses; and yet, to the casual observer, the two wagons are alike and built by the same maker. How rare it is for one to go over a farm from the entrance gate to the furthest paddock and find all gates properly hung. In a great many cases the fastening of the entrance gate is most complicated, frequently only to be removed with the loss of a little skin. It is necessary to lift the end of the so-called gate to prevent it ploughing out a deeper semicircular furrow in the soil. Division gates on such a farm are mostly composed of three barbed wires and a few mallee sticks, causing more loss of time than would be entailed in the manufacture of a decent gate. The entrance gate to a farm is a fair index to the owner's farming methods. Another undesirable friction is that which causes horses sore shoulders. I admit that in some cases it is next to impossible to prevent this, as some horses are very thin-skinned, and others scald very easily; but if more care were taken there would be less trouble. Almost every farmer has his own special cure for this, but a well-fitting collar is the first thing to see to. The next is to keep it clean and ease any place that may be causing a sore. Bathe the shoulders night and morning with a mixture of common washing soda and water. The idea of one of the most progressive farmers that I know is to first get a collar that fits the horse, soak it in water, and while the collar is wet work the horse in it; being soft it will conform to the shape of the shoulders. After being allowed to dry thoroughly it is given two or three coats of good paint on the cheek side. This forms a smooth and almost frictionless surface, with the result that he rarely has a horse with a sore shoulder. There are some forms of friction that are indispensable on the farm, a few of them are the friction between driving belts and face of pulleys, the friction of strippers, harvesters, and binder driving wheels in contact with the ground, which is necessary for driving the machinery. It is also friction that causes a wire nail or spike to hold so tightly when driven into wood. Then again the friction caused by brakeblocks on vehicles and implements is very necessary. The friction of horses' feet on a hard metal road enables them to pull their loads. If the friction is reduced by a slippery road the hauling power is reduced also. In dealing with friction of another kind, viz., that between man and man and man and beast, I would like to say that sometimes we are apt to forget that farmers and farm laborers are only human and subject to human weaknesses. It takes a lot of the farmer's time to look after some men, as tools are left or thrown down where used and frequently lost. If there is a weak place in any tool or implement it does not take this man long to find it. I do not wish to convey the idea that all farm laborers are black sheep—far from it. So far as I have seen there is not a better class of contented, hard-working, and industrious men in the Commonwealth than the straightout farm laborer. On the other hand, the friction is not always caused by the hired hand, as occasionally a farmer looks on his man as of far less value than one of his beasts in the paddock, and treats him as such, continually nagging at him from morning till night; everything he does is wrong. This class of farmer, I am pleased to say, is the exception and not the rule, as the farm laborer of to-day receives treatment far different from that which he received some years ago. Speaking generally, he is better paid, fed, and housed, and this has a tendency to lessen friction between employer and employé. Friction between man and animal on the farm is, I am afraid, too prevalent. A short-tempered, cruel man has no place among stock. As one writer has put it very clearly—'A bad tempered man is seldom of much use among stock; animals soon get to discriminate between those who are cruel and those who are kind to them. They will do much more for their friends than their enemies.' The writer knows of a case in this district where two men started with a team each at a long fallowing on the same farm. One started with a team in low

condition, the other had one in good condition. When the work was finished the order was reversed, as the fat team was poor and the poor one fat, and yet the team that was poor at the start had more acres to its credit. The explanation is—the one was kind to his team and the other cruel; both teams were fed alike. Where there is friction between man and dairy cows the contents of the milking pail show it very quickly. Animals of all kinds appreciate a kind but firm owner." Mr. Venning, in discussing the question, said wooden gates were preferable on the farm, as when broken they were easier to mend. The dipping of collars in water was beneficial where a heavy load was to be pulled, but with ploughing not much benefit was derived from the practice. Mr. Heaslip said sore shoulders frequently originated with lumps or boils, even if the greatest care were taken by the farmer. Mr. Teakle was of the opinion that machinery was frequently discarded by farmers before it was thoroughly worn out. Mr. Carmichael believed boils and blisters on horses' shoulders were due to the animals blood being out of order. Where collars caused bruises through becoming lumpy the trouble could be removed by the use of an awl.

Leighton.

PRESENT.—Messrs. T. Goodridge (chair), W. Gollett, S. Williams, J. Goodridge, J. McDonnold, J. Earle, W. Bailey, G. Bailey, W. Williams, D. Keynes, R. McWaters, R. Fairchild, A. E. McWaters (Hon. Sec.), and two visitors.

THE ELDERBERRY.—Mr. T. Goodridge read the following paper:—"There are two varieties of this tree, the black-fruited and the green-fruited, and, in addition, a garden variety, which is variegated, with white markings on the foliage. The tree is ornamental, with broad cymes of blossom and pale-green foliage, and in the autumn it carries masses of black fruit, contrasting well with the foliage. As a fruit-yielding plant it is not to be despised. It gives the popular elderberry wine, which, when taken warm or mulled with spices, is a most excellent remedy for colds and a composing draught on going to bed. The blossoms are used for distilling elder flower water, which is a cooling application in cases of inflammation of the face and in the case of attacks of erysipelas. An infusion of the leaves is fatal to various forms of insect life, and is used, when diluted, to destroy thrips, aphides, and red spider on plants too delicate to stand Gishurst and other solutions. The foliage is not eaten by cattle, and if laid in a green state in rooms or granaries frequented by mice it will drive them away. A few branches stuck about the harness of draught horses will greatly mitigate the plague of flies during summer. The elders are propagated by cuttings, which root freely in any ordinary soil."

Mount Bryan East, August 24.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. W. Quinn (chair), Gare, B. and W. Dunstan, T. Quinn, Hughes, F. Thomas, B. and L. Webber, and R. Thomas (Hon. Sec.).

EMASCULATING COLTS.—Mr. B. Dunstan read the following short paper on this subject:—"Before the operation of castration is commenced, pour a small quantity of oil into the animal's sheath. Grasp the neck of the scrotum firmly with the left hand, and make a slow but bold incision, and let out the testicle, leaving it suspended by the artery, after severing the muscular tissues. With the right hand the emasculator should be placed on the artery and the handles pressed tightly together for a period of from 20 seconds to 30 seconds. At the completion of the operation the wound should be dressed with carbolic oil. The emasculators are responsible for less swelling than is experienced when the clamps and searing irons are used."

Port Broughton, August 23.

(Average annual rainfall, 14 in.)

PRESENT.—Messrs. Pattingale (chair), Whittaker, Barclay, Hill, Pattingale, jun., Hoar, Harford, Fletcher (Hon. Sec.), and one visitor.

FOXES.—Mr. Pattingale mentioned that success had attended efforts to poison foxes by using baits consisting of birds, such as pigeons. Members agreed that the foxes had done a great deal of good in the district by clearing out rabbits,

Port Broughton, September 20.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. G. E. Pattingale (chair), Whittaker (two), Excell, T. E. Pattingale, Barclay, Harford, and Fletcher (Hon. Sec.).

TICK AND LICE ON SHEEP.—Mr. Barclay drew attention to the prevalence of this trouble amongst flocks in neighboring districts, and advised members to dip their sheep.

SALT FOR HORSES.—Members generally agreed that it was advisable to provide salt for horses in the shape of a lick. When it was given with the feed there was a danger of the animal receiving too much.

Port Germein, August 31.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Carmichael (chair), Head, Deer, Glasson, Teasdale, Stone, Hillam, Hackett, Crittenden, Stock (Hon. Sec.).

STABLE MANURE AND FALLOWING.—Mr. Deer read the following paper on this subject : —“In many places stable manure is wasted, not because farmers do not realise that it is of value, but because of the trouble and time required to place it where it will prove useful. Fertilisers, such as superphosphate, are much more quickly applied to the land, and results obtained are beneficial, but the use of stable manure in addition to other fertilisers is to be recommended. I would spread it on the land to be fallowed, heavily on poor land, and lightly on heavy soil. If it is impossible to spread the manure before fallowing, it should be put on the fallow and worked in. Where I have carried this out the results obtained have amply justified the trouble incurred. Substance cannot with impunity be taken from the land without an equivalent is returned to it, and stable manure provides the properties that the land requires. It also keeps the land more open. The object of fallowing is to clean the land, to conserve moisture, and to keep the soil open in order that the air may have free access to it and supply a certain quantity of nitrogen. The time to fallow is the most important point. When land commences to drift, it appears impossible to stop it. If it is allowed to become “drifty,” the fine particles disappear, and a coarse gravel is left, and the value of the yield decreases. Drifting is frequently caused through too large an area being worked. Narrow strips of crop should be put in, and pieces of fallow left between the strips. The prevailing winds should be studied, and the strips arranged in order that they will afford the greatest amount of shelter. When cutting wheaten hay, it is not only the question of weight, but the quality, that should be considered. Horses do better on hay cut when the flower is just dropping. Grain should be added if necessary. Hay is not so easily digested when in the dough state, and horses are liable to suffer from the various complaints which have indigestion as a foundation.” In the discussion which followed Mr. Crittenden considered that cultivating in strips was not profitable, as much feed would be lost. He considered drift in sandy soil beneficial, as it checked the growth of weeds. Mr. Carmichael agreed with opinions of the writer.

Port Pirie, September 7.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. E. B. Welch (chair), T. Johns, W. Munday, F. A. Johns, J. Greig, W. L. McEwin, H. G. Hawkins, C. E. Birks, A. M. Lawrie, H. Lawrie, T. B. Jose, A. Bond, W. R. Wright (Hon. Sec.), and 20 visitors.

LOUSY SHEEP.—The Chief Inspector of Stock, Mr. T. H. Williams, addressed the meeting on this subject. He stated that the only way in which the pest could be exterminated was by dipping all sheep, which could be done at a cost of about 1d. per head. Non-poisonous and tar preparation dips were useless, as they only cleared the lice away for about a month, then the disease became as bad as ever. It was not desirable to dip immediately after shearing, this was best done a month or six weeks later. Farmers should co-operate in building dips, thus saving a good deal of expense. If they neglected to stamp out the disease it would soon get a very strong hold, and severe loss might result to sheepowners. Dipping improved the wool. A flock free from disease would not become infected unless it came into actual contact with lousy sheep. Owners of lousy sheep were liable to a heavy penalty for exposing them for sale in a public saleyard. The law also provided that such sheep should not be travelled along a public road, or removed from the pasture on which the animals were when found to be infected. It was not the wish of the department to prosecute, but if owners persisted in being careless about the matter, the law would have to be enforced,

Whyte-Yarcowie, August 24.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. G. F. Jenkins (chair), Faulkner, McLeod, Lock, M. Walsh, J. R., G. D., and W. Mudge, A. Mitchell, Wittwer, McGregor, Robinson, E. J. and F. Pearce (Hon. Sec.), and one visitor.

HORSE DENTISTRY.—Mr. G. McGregor exhibited a skeleton of a horse's head, and drew attention to the fact that the two back grinders of the top jaw had cut their way into the corresponding teeth in the bottom jaw. The former were quite ½ in. longer than they should have been normally, and it was suggested that the death of the horse through starvation was probably caused in this way. Mr. McGregor said the bottom teeth must have been softer than those in the top jaw, and he advised the cutting of teeth in similar condition with a pair of dental snips. There was no danger of the horse swallowing the pieces of tooth cut off if the animal were operated on when standing up, and the pieces were removed before the gag was taken out of its mouth. Members generally were of the opinion that it was advisable to examine horses' teeth regularly, but unless the animal were suffering on account of abnormalities it was advisable to leave the teeth alone.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Friedrichswalde, September 21.

PRESENT.—Messrs. Goodfellow (chair), J. and F. Heintze, F. W. and E. Duldig, F. W. Schultz, T. Pfitzner, Coombe (Hon. Sec.), and seven visitors.

HARROWING GROWING CROPS.—The Hon. Secretary read the following paper on this subject:—"The system of harrowing growing crops has been practised in South Australia for a number of years, but it is only recently that it has become in any way general. The subject merits far more consideration from agriculturists than it has received, because of the benefits which the wheat plant receives from its practice. One of the chief objections is that it destroys so many wheat plants. Let us suppose for a moment that it does so, then the remainder of the plants benefit to an extent which easily compensates for the loss. Another aspect of the destruction by harrowing is that farmers who are opposed to the system very often lose more through careless and faulty pickling of the seed, but as they cannot actually see this loss, they do not realise it. The benefits of harrowing are numerous, but chief among them is the benefit to the soil, the destruction of weeds, and the checking of the upward growth of the plant. Harrowing the crop after it is out of the ground will help to conserve the moisture. For this reason it should be done after a rain. The loss of moisture by evaporation is greater than most people suppose, and any operation which tends to lessen that evaporation must certainly benefit the crop. By breaking up the surface crust evaporation is reduced considerably, and this is accomplished when harrowing is practised. The more frequently the soil is worked the more moisture is conserved. Then, in heavy land, harrowing has the effect of breaking the clods, especially after a rain. As a general rule weeds are more easily destroyed than wheat. This is due to the fact that the roots of the weeds lie nearer to the surface than do those of the wheat plant. While some wheat plants are undoubtedly pulled up by harrowing, it will be the weak, sickly plants, which, as a matter of fact are better out of it altogether, as, if they ever came to maturity they would yield but a poor return. The conclusion that harrowing checks the upward growth of the wheat plant is arrived at by the admitted fact that a certain amount of wheat plants and weeds are destroyed, thus leaving more nourishment and moisture for the remainder. This additional sustenance permits the plants to throw out fresh 'stools,' and as a natural sequence, more profitable returns are secured. Feeding off crops is practised a good deal, but I do not think the benefits to the crop by this method are in any way comparable to those obtained from harrowing. The harrows should have sharp points on long, thin tines, and the harrowing to be most effective should be done immediately after a rain, and when the wheat plant is firmly rooted, and is from 4 in. to 6 in. high. This is certainly an inconvenient time, as

fallowing will be in full swing, but it will pay handsomely to leave the fallowing for a time, and harrow the crops. What I have written applies chiefly to wheat intended for grain, but for hay crops I would advocate harrowing first, and then, to level the surface, rolling. Those who do not believe in the system of harrowing growing crops have it in their power to experiment, on say an acre, or even half an acre of land under crop. Even should a loss result, indirectly the experimentalist would be the gainer, as his convictions would be strengthened by practical knowledge. However, I have not the slightest fear that a loss would result, provided the experiment were carried out in a proper manner."

Greenock, August 31.

PRESENT.—Messrs. A. Heinze (chair), J. Jungfer, J. C. Jaensch, A. Nitschke, B. Nitschke, F. W. Nitschke, H. Koch, F. G. Pfeiffer, O. Semmler, E. Geyer, J. G. Arnold, W. Roenfeldt, E. Roenfeldt, P. Kernich, T. Listner, W. Nenke.

PRGS.—Mr. R. Tümmel read the following paper:—"The breeding and management of pigs should be one of the most important agricultural interests in this State. To be successful, none but the best breeds should be allowed on the farm. The first requisite is good feeding from the time the animals are born until they are slaughtered. You can neither breed nor keep pigs profitably by starving or allowing them to shift for themselves; as elsewhere, so in stock-raising it holds true, that what costs little to acquire brings little at sale. Care and labor to secure the best will always pay the most. Many years ago there was a big demand for everything large in the way of pork, and many people turned their attention to the Tamworth breed, for the simple reason that big hams and big sides of bacon were fashionable; but to-day there is a decided distaste to large joints. Bearing this fact in mind, I can thoroughly recommend the Berkshire. This breed, given proper attention, possesses wonderful powers of early maturing. The pigs are active and yet contented, and turn to good account the food they receive. The boar is the chief source through which the ordinary stock has to be improved, and as the offspring are likely to take his shape, it is most important that he should be well formed and sound. If he is high on the legs, thin in the forequarters, and narrow across the loins, it is certain that his stock cannot turn out well. The ribs should be well sprung from the backbone, the sides deep with thick flesh, and the flank full. A pig which is thin in the flank is not a good bacon pig, and the hams are generally badly developed. The sow should be the same shape as the boar, but there are points of maternity which should not be overlooked. Perhaps the most important is that having produced a family she should be able to support it. The minimum number of teats which a breeding sow should possess is 12. It is well to breed from a good-tempered sow, and one which has not shown signs of a desire to eat her young. The period of gestation is 16 weeks, and during this time she should be kept in good store condition and have plenty of exercise. Cereals are the most valuable feed for pigs; they are, however, apt to be too heating if they form the whole diet. It is a good plan to feed green barley or, if possible, let the pigs graze on it, as the system is kept healthy. Thick, square pigs are best for killing at an early age. Such pigs, if well bred, are never lean. When the aim is to kill them as small porkers they should never be stinted for food. It must not be forgotten that the pig that is being well fed requires something to counteract the acidity of the stomach, and this can be best given in the shape of wood ashes and charcoal, a supply of which should always be provided in the fattening pens." In discussing the subject, Mr. J. C. Jaensch said large hams were not desired at shows, about 12lbs. to 14lbs. was quite large enough. The Berkshire and Essex were the best bacon pigs, being early maturing breeds. The feeding of pigs made a considerable difference to the lard. Some was found to be quite crumbly, and other soft and white. Copra cake had a good effect on the quality of the lard.

Nantawarra, August 22.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. R. P. Uppill (chair), S. Sleep, J. Nicholls, F. J. Sutton, T. Dixon, A. F. Herbert, J. Sinclair, and G. L. Tucker.

SUPER.—A general discussion took place on the free-running qualities of super.; also on the strength and general qualities of the different brands on the market. Mr. Sleep mentioned that at one time super. was supplied at a very high water-soluble percentage, and was mixed with sand by the farmers themselves. He thought the results were equal

to those obtained at present. Members were of the opinion that, if the results proved as satisfactory, a great saving in freight and cartage would be effected by receiving their super. in such a manner.

SEEDING.—Mr. J. Nicholls, in opening a discussion on "The advisability of sowing before or after the rain," said there was only one course to pursue, and that was to wait for the rain. This season, owing to the lateness of the rain, was an exceptional one, and many farmers had put in their crops in a dry state. The crops this year might prove a very good object lesson to the observant farmer. His contention should not be judged by one year's result, however. If taken over a period, say, of 10 years, he had no doubt as to the ultimate result. Because a farmer had 400 acres of fallow it did not necessarily follow that he should crop it all in the one season. A smaller area drilled in at the right time, i.e., after the rain, would more than compensate, through the increased yield, for the waiting. If a farmer, through waiting for rain, were only able to sow 300 acres out of 400 acres of fallow, but obtained nearly as much wheat off the 300 acres as would have been secured from the 400 sown in a dry state, he was a distinct gainer. In addition to the saving of seed, manure, and labor, he would also have 100 acres of fallow left for the next year. Mr. Sutton had worked his fallow—which was only separated from Mr. Nicholls's by a road a chain wide—a great deal more, and had drilled in his crop in a dry state a month before Mr. Nicholls had drilled his in. The difference in the two crops was very great. Mr. Nicholls's crop was a beautiful healthy green while his own was yellow-looking and withered. He considered his crop 50 per cent. inferior to the other. Mr. Sleep had observed that the majority of the crops sown before the rain were very weedy, and thought the returns would be affected accordingly.

Northfield, September 3.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Dall (chair), Goldney, Roeger, Reynolds, Wright, Eastwood, and Mitchell (Hon. Sec.).

FARMING METHODS.—Mr. Dall read a paper as follows:—"Agriculturists to-day have advantages which our fathers and forefathers had not. At one time land had to be ploughed with a single-furrow plough which, after a time, was replaced by the double-furrow, and years after by the stump-jump plough. We now have ploughs of four to 12 furrows. This alone has assisted the farmer to a very great extent both in saving of labor and enabling him to get over the work so much more quickly. Agricultural field trials could be given more attention. These trials or shows are too scarce. If more were held, and especially in connection with the Bureau, I feel sure that our manufactures would be better advertised. I know there is a vast difference in opinion as to the class of horse most suitable for the farm. The medium draught is condemned by a large majority of farmers, but I favor the medium light-boned horse. It stands more work and does it more easily, besides being easier and cheaper to keep. I would strongly recommend farmers to try horses about the stamp of the Suffolk Punch type. Deep or shallow cultivation has a large scope for experiments, and in some places these are being carried out. It is recognised throughout that the cultivating process is far more difficult now than it was years ago. Fallowing is undoubtedly the heaviest part of farm work. The usual custom is to plough 4in. to 5in deep, and in heavy land with a five-furrow plough it requires eight good horses. Here, I think, an experiment could be tried by ploughing, say, 3in. or even less, and I venture to say the same ground could be ploughed with six horses, thus saving two horses, which could be used for other work. With the cultivation that is given fallow land, I think the result would be as good. Experiments in wheat-growing are in an advanced stage, and should prove a boon to the farming community. Our own Government experimental works are a credit to those who carry them out, both with regard to treatment of varieties and the farming plots. I think the experimental work could be enlarged upon. If less wheat and manure would give as good results, why should we not economise? When drills first came in, the chief point in their favor was that there would be a big saving in seed. Before the drills, thin sowing was the general rule; to-day it is nothing less than a bushel of wheat, and up to 1½ bush. to 1½ bush. to the acre, with the result that there is more straw but less wheat. I would like to see an experiment of thinner sowing under the present method of farming carried out. Another trial which would prove an advantage to farmers is that of a threshing plant. Although it may mean a big outlay at first it would soon pay its way. If a few farmers were to co-operate the outlay would not seem so great. The plant could be fixed in some central place, and each farmer could have his crop treated as his turn

came. I feel sure better seed would be the result. It would give every farmer a chance to secure his own selected seed, which would be kept pure. The headed straw could be stacked, and if treated with salt would make good chaffed feed and an excellent standby, and also a saleable article for second-grade feed, especially if the crop were cut at the right time. Mixed farming is worthy of a trial. The benefits to be derived from sheep on the land alone would be great. Combined with the growing of fodder crops such as rape, kale, lucerne, peas, &c., it would give the farmer a good chance of keeping his sheep well, and he should, by careful selection, be able to raise fat lambs which should command the highest prices, especially where close to the markets. For our district I would suggest that good ewes be selected, and the best export lambs bred. Keep just that number that can be fed properly. When the lambs are disposed of, fatten the ewes and sell them or buy more according to the available feed. The putting down of ensilage is another item which should prove successful. Where hay is cut and thick sowing indulged in, one often has rank spots in the crop. If these were cut when standing or green and put into ensilage they would be better utilised than if left for hay. In districts like this ensilage is more economical than the system of carting out the sheaved hay to feed to cattle. It would pay farmers to put in a few acres of crop for the express purpose of making ensilage."

Saddleworth, August 16.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. P. Manning (chair), F. H. Kelly, W. Seales, W. Crawford, F. Snell, J. Plueckhahn, R. Rex, and F. Coleman (Hon. Sec.).

CUTTING WHEATEN HAY CROPS.—The article by Professor Perkins on the subject of the best time to cut wheat for hay, published in the June *Journal*, was discussed. Mr. Kelly was unconvinced that wheat cut in the green stage would weigh less than that cut later. Other members also thought the presence of more flag and a slightly bulkier straw would mean more sheaves to the acre, and would largely counteract the weight of each individual sheaf of the ripely cut hay. Members generally were in favor of cutting the hay with the idea of securing the best quality, and in this members supported the ideas of Professor Perkins. Wheats of the Medeah class, such as Le Huguenot and Indian Runner, should be cut as soon as the blossoming season was over.

Saddleworth.

[CORRECTION.—In our last issue a paper on the care of harness was said to have been written by Mr. F. Coleman. This paper should have been credited to Mr. P. Manning, by whom it was written and read at the meeting.—ED.]

Salisbury, September 3.

PRESENT.—Messrs. E. V. Harvey (chair), J. Harvey, Bagster, Urlwin, McNicol, Sexton, Neal, James, Hooper, McIlashan, T. Judd, Hier, Goodall, Patterson, Sayers, Coker, Tate, A. G. Jenkins (Hon. Sec.).

THE EFFECT OF LIME ON SOIL.—Mr. E. Moss contributed the following paper:—"I do not apologise for quoting so copiously from Professor A. D. Hall's work on fertilisers and manures, because as a source of information on the subject he is regarded as one of the best authorities; and the subject is one of such vital importance to farmers in this district, with its heavy clay soils, that it seemed to me worth while to select and place before you such facts as would be of most value and most likely to be kept in mind. The references made by Hall to results from the use of lime apply mainly to experiments made in England, chiefly at Rothamsted Experimental Farm; but from experience in the use of lime in different forms in various parts of this State, we have no reason to believe that his conclusions will not apply with equal force here. At Renmark, and generally on the Murray settlements, gypsum is regularly used and looked upon as a necessity in bringing the soil into and keeping it in the best condition for cultivation, and the growth of fruit, &c. Gypsum is used because it is cheapest, being procurable a few miles from Renmark. The use of sea shell in this district has had such a marked effect in increasing the productiveness of the soil and in making the soil more amenable to cultivation that

a much more extended use of it can be safely recommended, and a few remarks bearing on this subject will not be out of place a little later on. 'There are several substances commonly used by farmers as manures, which produce desirable effects upon the crops, although they are not themselves plant foods and only act indirectly on the soil, either by making it more amenable to cultivation or by bringing into action the stored-up reserves in the soil. Such substances are lime, gypsum, salt, all of which contain elements present in the plant, though they also exist in the soil in quantities sufficient for the nutrition of the crop; they are valuable as soluble salts for their indirect effect in making when soluble other more important plant foods in the soil.' Hall says that it is not known when the value of lime was first discovered, but the uses of marl and lime were recognised among the Romans. He quotes from Pliny, who mentions different kinds of lime and their value both in the field and the garden: 'The regular use of some form of lime or chalk,' says Hall, 'was part of the accepted routine of farming as early as we possess any records of British agriculture, and among the manures it figures in all books of the sixteenth and seventeenth centuries. In fact, 'the black and the white,' dung and lime, were the only manures employed by the great mass of farmers until well into the nineteenth century. Lime itself, or quicklime, is obtained by the 'burning' of any form of calcium carbonate, which occurs as limestone (either pure in the mountain limestone of Derbyshire and North Yorkshire, or argillaceous in the Lias), as chalk, and even as shell sand, on the Cornish and other coasts. The so-called 'burning' consists in driving off by heat the carbonic acid contained in the calcium carbonate. The resulting lime, known sometimes as quicklime, stone lime, cob lime, lime shells, &c., combines with great readiness with water developing much heat and falling down into a fine powder, termed 'slaked lime,' and this slaked lime will then combine with the carbonic acid present in the atmosphere to reconstruct the original carbonate of lime. Thus when lime is applied to the soil it very rapidly becomes carbonate and the effects of 'liming' are really due to carbonate of lime. Since lime becomes calcium carbonate in the soil, obviously the same results would be obtained by applying the latter material; the main advantage in the use of lime lies in the very fine state of division into which it falls on slaking and the consequent good admixture with the soil that is effected.' Referring more directly to the practice of liming, Hall says: 'When the practice of liming was more general it was customary to apply very large amounts, 4 to 6 or 8 tons per acre at long intervals, but this is likely to act injuriously by causing too rapid oxidation in the soil at first, and the better plan is to put on 1 ton or so of ordinary lime every time the turnip crop comes round in rotation, or 5cwt. to 10cwt. of ground lime to each crop for which artificial manures are applied. A heavy dressing of lime is also supposed to affect the processes of nitrification detrimentally for some time after its application. Lime, chalk, or ground limestone, in whatever form it is used, should always be applied to the land as early in the winter as may be convenient, on arable land before ploughing. The question of whether lime is required as a regular part of the routine of farming on a given soil can only be decided by an analysis of the soil; any soil containing less than 1 per cent. of calcium carbonate will be benefited by liming, and when the percentage falls to $\frac{1}{2}$ per cent. lime becomes a necessity to enable the manures to exert their proper action. Many clays and sands are in this latter condition; and although the absence of lime may often be concluded from the appearance of the vegetation, every farmer ought to get a determination made of the amount of carbonate of lime in his soil, because the whole scheme of manuring should depend on whether the soil is properly supplied with a base. This is how Professor Hall says we may determine for ourselves whether or not lime is deficient in the soil: 'If a little soil, when covered with dilute hydrochloric acid shows no visible effervescence, the proportion of carbonate of lime must be below what is desirable for the healthy growth of vegetation. Nor must it be supposed that the use of artificial manures, such as superphosphate of lime, or bones, which are phosphate of lime, or gypsum which is sulphate of lime, will obviate the necessity of liming. Lime or its carbonate is needed in the soil to supply a free base, and in the compounds mentioned it is already saturated with a fixed acid; in fact, in superphosphate of lime there is an excess of acid, so that this fertiliser reduces the amount of carbonate of lime in the soil. Stone lime should be distributed in small heaps, covered with a little earth and left for a week or two to slake, under which conditions it will fall into a fine powder. The heaps are then broken down and thrown abroad before ploughing. The action of lime is partly physical, affecting the texture of the soil, and partly chemical, setting free the dormant reserves of plant food. On the strong soils the physical action of lime is most manifest; it acts by flocculating the finest clay particles, causing them to aggregate into temporarily larger units, and so making the soil effectively of coarser texture. The soil thus becomes less retentive of moisture; percolation is increased, making the limed land drier and warmer, so that

it admits of cultivation earlier in the spring and is far more friable when dry. In dry seasons the clay will crack less and the crop will keep on growing longer, because the improved texture of the soil admits of a better supply of subsoil water to the plant by surface tension. It is difficult to exaggerate the improvement that lime effects in the dryness and workability of strong soils, which, in many cases, would not be fit for arable cultivation had they not been so treated. . . . On the lighter soils—the sands and gravels—lime exerts a good effect by forming a weak cementing agent and increasing the cohesion of the particles. As a rule, however, it is not wise to apply quicklime in any quantities to very light open soils, because oxidation of the organic matter is pushed on too rapidly. Either chalk or marl, or some form of calcium carbonate should be used, or the quicklime should only be applied in small quantities. From the chemical side the great value of carbonate of lime in the soil lies in its power of maintaining the neutral reaction necessary to the development of those bacteria which oxidise the organic compounds in the soil to the state of plant food. In the absence of lime, organic matter by its decay gives rise to various acid bodies which may be grouped as humic acid, and the acidity thus produced inhibits the action of many of the valuable groups of bacteria, such as the azotobacter which fix nitrogen, and the nitrifying bacteria which convert ammonia into nitrates. It has been shown that in soils that are acid through the accumulation of humic acid, nitrification is at a standstill and bacterial life generally is repressed in favor of the growth of moulds and micro-fungi, which compete actively with the crop for the plant food in the soil. . . . It is on soils with a tendency to sourness that liming has such a good value, for in such cases dung or any other organic manure only tends to aggravate the evil. . . . It should also be noticed that the action of lime is slow, and is more manifest in the third and fourth year after its application than in the first and second. . . . But the nitrogenous compounds in the soil are not the only ones rendered more available by the presence of carbonate of lime; both phosphoric acid and potash are thereby kept or brought into a more soluble form. . . . A soil may contain considerable amounts of phosphoric acid, which in the absence of lime is combined with ferric oxide or alumina, so as to be in a highly insoluble condition. . . . Applications of lime or calcium carbonate are of great value on these soils, because they form a certain amount of calcium phosphate by interaction with the iron or aluminium phosphates, and so increase the proportion of phosphoric acid in the soil water. The action of lime upon the potash compounds in the soil is equally marked; as the soil water carries down the dissolved calcium bi-carbonate it attacks the zeolitic double silicates in the clay and a portion of their soluble bases, potash among them, changes place with the lime and comes into solution. Thus lime is precipitated and potash is found in the soil water. . . . Where potash had not been used prior to the application of lime on a certain plot at Rothamsted,' says Hall, 'there was little or no increase of yield, because there were no reserves of potash to be set free. That lime acts in this fashion may also be inferred from its beneficial effect upon clovers and other leguminous plants in a mixed herbage, or by the remarkable power of basic slag to promote the growth of white clover in a pasture where it was formerly dormant. Other phosphatic manures have often little effect in such cases, so that free lime in the basic slag, by liberating potash, is evidently as important a factor in the growth of clover as the phosphoric acid. If the basic slag is applied to a soil poor in potash it has little effect, and again after two or three applications to grass land it ceases to show its previous beneficial action upon the clover because the readily attackable potash in the soil has all been brought into solution, and a direct application of potash salts becomes necessary.' As this was probably the first district in South Australia to use sea shell as a fertiliser, some farmers here having applied it to their land as far back as 40 years ago, the awakening which is now taking place as to its value is interesting, and confirms what has long been held to be true by those farmers around here who have given it a trial. It will be remembered that it was regarded as incredible by some former heads of our Agricultural Department that shelling the land could have had the great results claimed for it here, when notice was attracted to the subject by some reference in the press; and it was then stated that whatever effects shell would produce would be due to the lime contained in it, and that the amount of lime applied in this way would be too small to do the good that it was said to have done. With this in mind it is interesting now to find that our present Director (Professor Lowrie) is urging the Government to secure the Spit at Kangaroo Island as a source of supply of shell for farmers, and he strongly recommends its use on farm lands. If shell has proved so beneficial here as is alleged by those who have tried it, the question will be asked, why has its use not become general amongst the farmers around where its beneficial effects will have become known, and where there is a source of supply so close at hand? This tardiness to take advantage of an opportunity to increase the fertility of the land at

comparatively small cost may be due more or less to two or three different causes. Farmers in the past were slow to adopt new methods. One of our largest farmers here, before following became as general as it is now, argued against it as a waste of one season's crop. Farmers are more progressive now, and ready to adopt anything that will promise better results. And again, I doubt if it was half believed that the shell did the good it was said to do; and we must not forget that this doubt has been encouraged by our chief agricultural authority in the past. And, last, though the shell is only a few miles away it meant the employment of a big team and a man to procure the shell and spread it on the land, and there always seems to be plenty for both horses and man to do on the farm nowadays. In the light of the proved benefits of lime generally, however (which benefits are calculated to follow its use in a special degree in our district), and the known good results which have been derived from the application of shell, it is worthy of serious consideration whether we are not losing in our returns every year by not more generally and systematically adopting shell as an important factor in the treatment of the land, and regarding labor connected therewith as part of the yearly routine of the farm. It is not possible that the whole farm could receive a shelling in one year. This, on an ordinary-sized farm might take five years, allowing for the work the time when the teams are not employed upon other necessary work upon the farm. It has been so consistently maintained by our farmers who have used shell, however, that its benefits are prolonged over very many years, and that they are very marked in some years, that the labor cost of one shelling seems about the most payable thing that a farmer could put his team at between the seasons; and he might even consider whether it would not pay better for a time to leave the carting of his hay to market to others while he gets a coat of shell on his land. Now to refer more particularly to the known benefits from the use of shell in this district, I remember being told more than 20 years ago by a farmer who was situated two or three miles west of this township, and who consequently was not very far from the source of the shell, that certain strips through his land had been shelled 15 years before and that these places then showed better results than the land which was untreated, the crops being higher, thicker, and greener. Doubtless influenced by this experience others have had portions of their land shelled, and in only one instance has it been said that it had not a most marked influence in improving both crop and pasture. The exception referred to seems to have been in connection with black land of a loose nature, which probably had a sufficient supply of lime, or was so open in its nature that shell might act quite detrimentally to it. Apart from this experience there seems to be no doubt as to the value of the shell in making the soil more workable and improving the returns from it. One told me recently that he could tell the land which had been shelled by the feel of it under his feet; that is, the shell was so effective in preventing the setting of the soil that it was sometimes noticeable by walking over it. On my own place I have always noticed a difference in the crop, and in the grass when there is no crop, on one portion of the land, and this part always shows a better crop very distinctly divided by a straight line across the paddock, and judging from the effects produced by shell in other instances and believing the former owner had some of his land shelled many years ago, I have always ascribed the difference noted to the shell. These will hardly be looked upon as scientific data, but a well-marked difference in a crop under stated conditions, if it is fairly consistently repeated, satisfies most farmers as to the value of the result of an experiment, and we find that those who have had most experience of the shelling of land are the strongest advocates of its use, and are showing their faith by getting more of it on to their land as opportunity offers. Professor Lowrie estimates the cost of shell, ground, from Kingscote at about 12s. 6d. per ton on truck, Port Adelaide. Delivered at Salisbury and spread on the land the price would be about 17s. 6d. per ton. The shell carted by the farmers' own teams from the St. Kilda swamps would probably average for different parts of the district about 4s. per ton. Allowing even a 50 per cent. superior value—which may not exist—to the Spit article, our local shell is apparently cheaper to use by 100 per cent. Probably our gardens would benefit by the use of shell, especially so where the soil is heavy. I had three samples of soil analysed by the Agricultural Department when Mr. Richardson was Acting Director, and the chief deficiency in the three was lime, and Mr. Richardson recommended lime to be used in some form, though he also thought superphosphate might be found beneficial. Probably shell would not prove of much benefit in our best alluvial soils, but by its more ready action upon the food elements in the soil quicklime would be likely to prove much more valuable in assisting the trees to develop a full crop to a state of perfection. I have used gypsum with good results as regards the physical condition of the soil, and I intend to try sea shell in places where the soil becomes compacted and quicklime where the trees bear heavy crops with small fruit."

Stockport, August 23.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. F. Watts (chair), D. G. Stribling, C. Perry, S. Nairn, J. Smith, A. Rodgers, J. Connolley, T. Megaw, T. Howard, E. Weckert, G. Thomas, T. Higgins, R. Whitelaw, C. W. Cant, J. Murray (Hon. Sec.), and three visitors.

CO-OPERATIVE INSURANCE AMONGST FARMERS.—This subject was dealt with in a paper by Mr. Nairn, in which he pointed out the advantages that would accrue to the farmers if they adopted the system of co-operative insurance. A committee was appointed to draft out a scheme and bring the matter up at a future meeting of the Branch.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Arthurlton, August 28.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. J. Welch (chair), M. Lomman, W. Short, A. Klein, J. Page, T. H. Howlett, J. Collier, R. and A. Burns, G. Bull, W. R. Stephenson (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—The meeting was held at the residence of Mr. G. Bull. The crops on the farm were inspected, and they gave promise of fair returns. One paddock, which was in wheat last year, had been sown in strips with barley, oats, and peas. The intention was to fallow it next year, and the following year to cross drill it with one variety of wheat in order to see the effect of the different crops on the succeeding wheat crop.

BEST WHEAT FOR HAY.—A discussion took place on this question. Members generally favored King's Early and Curly's Early. The heavy wheats mentioned were Majestic and Baroota Wonder. For length of straw Le Huguenot was best, but it was rather coarse and tough. Medeah was also a good hay wheat. The Hon. Secretary had drilled oats on stubble land, and had obtained most of his hay in that manner. Horses did best on oat feed, and it was grown more cheaply. An oat crop discouraged takeall.

BUNT.—It was generally thought that the pickling of oats in a solution of bluestone in hot water was more effective than when cold water was used.

Minlaton, August 23.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. J. Martin (chair), R. O. Page, H. H. Evans, E. Correll, S. Vanstone, H. A. Chester, W. Bennett, S. F. Hoyle, J. W. Griffith, J. McKenzie (Hon. Sec.), and two visitors.

HARVESTING GRAIN.—Mr. S. Vanstone read the following paper on this subject:—“About 50 years ago the wheat grown in South Australia was acknowledged to be the best in the world, and it brought from 2d. to 3d. more per bushel than that grown in Victoria, to which State a great part of the wheat grown in this State was at the time exported. Now our wheat does not command a higher price than wheat grown in the sister States, and this is largely due to want of care in preparing for market. In the early days of this colony a great part of the wheat was cut with the sickle, threshed with the horse-power threshing machine, and usually put twice and sometimes three times through the winnower, the result being a clean sample of grain. Though no one would wish to go back to those primitive modes of agriculture, something should be done with our present up-to-date machinery in order that we may regain our good name. With little additional labor and extra expense the appearance and selling value of the wheat could be considerably enhanced. The harvester should not be used until the wheat is ripe. The neglect of this precaution has been the chief cause of the damage of wheat by weevil, which has been so prevalent since the introduction of the harvester. Wheat can be safely reaped with the tripper two or three days earlier than with the harvester, as the

dry chaff prevents the grain from packing too closely together and absorbs the moisture. For similar reasons damp wheat should not be put into the bags. Harvesters may often be seen at work when a light shower is falling. Sieves or screens should be cleaned often. It is impossible to obtain a clean sample when they are choked up. If there are a few bags that are not of a good sample they should be recleaned or fed to the fowls. The buyer's agent might pass them in, but it is not fair to the merchant, the agent, or to the farmer who makes a point of cleaning his wheat well. Unless some of it is very inferior, all the wheat is stacked together, and the slovenly farmer benefits by the careful man's extra work, as the prices are fixed upon the average sample. If by more attention to these small matters we can increase the value of our wheat by 1d. per bushel the gain to the State on a 20,000,000 bush. crop would be considerable." In the discussion which followed, members generally agreed with the paper, but thought there was not sufficient inducement for cleaning the wheat, as the easiest and quickest way of getting wheat to market generally paid best. The system of cleaning and marketing wheat was unsatisfactory, and the Branch would welcome any improvement, so that a better sample could be submitted to the various markets.

Minlaton, September 20.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. C. Parsons (chair), R. O. Page, E. Correll, T. Giles, H. H. Evens, A. Washington, J. Boundy, A. D. McKenzie, J. McKenzie (Hon. Sec.), and one visitor.

FARM MANAGEMENT.—Mr. Evens read the following paper on this subject:—"Employ the most competent and industrious men obtainable, pay the best wages, but insist upon the laborer giving his best services in return. It is false economy to employ incompetent men and boys to do men's work simply because they work for less wages. Induce your men to start work early in the morning so that they may finish in good time at night. A man will complain and become dissatisfied much sooner at working late than he will at starting early. Do not put your men at disagreeable or unpleasant work such as cutting chaff on a windy day, or sewing bags, or stacking hay when the temperature is 110° in the shade. Do not wait until your chaffhouse is empty, but cut chaff when the weather is favorable. Insist on your men paying proper attention to the horses in regard to grooming and attending to their shoulders and regular feeding. Do not allow the practice of giving the horses enough feed when they come in from work in the evening to last until the next morning. The horses waste it if the manger is full, and it becomes stale and picked over, and they do not do so well as when they are fed up the last thing at night. Although it is the general practice to allow the horses to run loose in the stable and yard, I prefer that each horse should be tied up in its own stall, and its harness hung alongside. Otherwise there is always more or less fighting and kicking. The timid horse does not get its share of feed. They knock down the harness and tread on it. When you come to harness up, the horse has to be chased with the harness, often through a slushy yard. In the seeding time leave the paddock for dinner in order to reach the stable not later than noon, otherwise your men and horses work one and a half or two hours more in the forenoon. Procure all tools that are reasonably necessary upon the farm. When not in use keep each tool in its own particular place. Adhere to this rule rigidly yourself, and insist upon your employees doing likewise. The way to oil machinery is a 'little and often.' House your machinery direct from the field. Have your sheds of sufficient height to allow binders, harvesters, &c., to pass under freely. When you have finished with your machine do not leave it in the yard in the sun or rain and a menace to stock, but put it in the shed immediately. It has only to be done once. Also keep wagons, trollies, and drays under cover when not in use. Keep your machinery and vehicles in proper repair and paint them occasionally. In the event of a breakage, and you effect temporary repairs in the paddock, do not allow it to become a permanent repair, but take the first opportunity of fixing it up properly. In the case of a lost bolt a piece of wire will not make the parts so tight and rigid as another bolt would. Always keep a good supply of all sizes and lengths of bolts. They are very cheap, and you often lose the value of many bolts in time wasted looking for something to take its place. When you have finished with an article or machine borrowed from your neighbor, see that it is in as good order as when you borrowed it. Then return it to him promptly. Endeavor to keep your fences in good repair, especially the half adjoining your neighbor. It will prevent your stock trespassing and be an incentive to him to keep his half good too. After opening a fence to cart out stones, wheat, &c., fix up the opening properly.

Do not allow it to remain hitched up in a loose way for years. Do not erect new fences of less than six wires; with five wires the gauge is too wide for sheep, or the height is too low for great cattle. It is a mistake to spoil a good fence for the sake of an extra wire. In cultivating your paddocks keep the drill well away from the fences. If you drill close the swings often strike and bend the iron posts and stock are constantly pushing the fence by reaching after the crop. It is a good plan to cut around the crop with the binder. It saves knocking down the grain, gives you a fair start with the harvester, and allows you to keep the bags away from the fences without reshifting them. It has already cleared away the stubble for ploughing for burning, and allows of it being done before harvest, thus providing a cheap insurance against fire. When the time comes to burn the stubble, clear around any nice trees and protect them. They are worth the trouble, as they beautify the field and shade the stock. Should a tree, however, die from fire or age, remove it instead of cultivating around a dead log year after year. Let your neighbor know when you are going to burn and ask him to lend a hand. Then reciprocate. It is not nice for your neighbor to see smoke coming over the hill in his direction and not know whether it is by accident or design on your part. Use only the very best and cleanest seed. There are always enough weeds in the land without sowing any. If you keep your own seed, put it in new sacks turned inside out. You will then have practically new sacks at the next harvest. In stacking seed or grain of any kind in the barn, always stack the bags on end to minimise the damage by mice. Empty sacks should not be allowed to lie about to be eaten by mice and rot in the wet. If bags are laid out perfectly flat in heaps mice rarely hurt them. As farming is as much a business as any other trade, keep a diary. Record the dates of sowing, services of stallions and bulls, when the rams are put in and taken out. You know then when to expect the progeny. Record your buying and selling, it will enable you to easily make out your income tax return. If you are working on an overdraft at your bank, sell your wheat at harvest time. If you hold 2,000 bush. of wheat for six months and then sell at 3d. per bushel more than the price at harvest you are no better off; besides, you have often to sell at a lower price, then you lose both ways. If your bank balance is on the right side do not keep a very large current account. Idle money is a direct loss to you. Do not attempt too much. A little well done often returns more net profit than a lot badly managed. To attempt too much often causes your seedling to be late, or the land to be neglected for want of time. At harvest the grain is about the paddock unsewn and uncartered, losing weight every day for an indefinite period. The hay is also left in the paddock until after the reaping and becomes very drv. Generally at this time the farmer is overworked and worried, especially if he should have indifferent employes. When things are in this state there are sure to be numerous little wastes and leakages that he cannot attend to, in fact he is so overworked that he often does not notice them at all." In the discussion which followed members generally agreed that married men were usually the most reliable for farm laborers, and every farmer should provide good accommodation for married men. A small kit of blacksmith's tools was very useful. Members thought it more profitable to sell the wheat at harvest time each year than to store it.

ENSILAGE.—It was generally agreed that an old tank, provided it was airtight, provided a suitable pit for the manufacture of ensilage. The Chairman had fed cows on ensilage that had been buried for five years in a tank.

Pine Forest, August 27.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. D. Carman (chair), A. Hewett, G. Inkster, W. Attenborough, S. Barr, R. D. Goodridge (Hon. Sec.), and one visitor.

MIXED FARMING.—Mr. W. Attenborough read a short paper on this subject. He recommended the farmers to provide an ample stack of feed for their animals, as there was always the possibility of a dry season being experienced. With proper attention, dairying would be found payable in the district, especially if barley were grown for green feed and a silo were erected for the conservation of fodder. The Shorthorn was perhaps the best breed. The keeping of pigs would also be found profitable, and he strongly advised all farmers to stack straw. In discussing the paper Mr. Carman said that in the majority of cases mixed farming was advisable in the district. Where cows were kept regular milking was essential.

WESTERN DISTRICT.

Coorable, August 24.

PRESENT.—Messrs. A. W. Hardy (chair), Giles, Riddle. W. H. Wheadon, Atkins, Roberts, Underwood, C. Hobbs, Coppins, Murray, Woodforde, C. Wheadon, Evans, C. Fox, Iles, Weston, Jackson, Kinsley, Cousins, Gregory, H. V. Hobbs (Hon. Sec.), and seven visitors.

TANK-BUILDING AND LIME-BURNING.—Mr. N. M. Roberts read the following paper :
—“ Without doubt the supply of water for our households and stock is one of the most important matters with which a farmer has to deal, and the value of a good water supply can hardly be overestimated. Every farmer should build sufficient tanks to enable him to have 12 or 18 months' supply. He would then have an abundance to carry him through a period of drought. If water cannot be obtained by sinking, as is the case in many places, and especially in the mallee country, tanks should be built. Well-sinking is expensive at any time, but is even more so when the quest after good stock water proves futile, as is evidenced in our own district again and again. The question of the size of tanks is one which needs consideration, and one cannot study too carefully the position of his tank. Tanks should neither be too large nor too small. I do not favor constructing tanks smaller than 25ft. by 16ft. by 8ft., nor would I build one with a capacity of over 50,000galls. From what I have seen in this district farmers do not consider the position of the tank or the making of drains of any importance. I am firmly convinced that the most suitable place for a tank is near the bottom of the slope of a hill. I have had several tanks made right in the gully, but on no account would I construct any in a gully again, as I find it far more difficult to get water to run into them in the valley than when they are on the side of the hills. Another point in favor of this position is that when filled the surplus water has a chance of flowing away. Implement sheds, barns, and stables should be built with iron roofs in order to catch all the water possible. Thousands of gallons could be stored if fair-sized tanks were built. If not, the farmer finds himself reduced to water carting—the most expensive and unsatisfactory task he has to undertake on his farm. There are times of the season when he needs more than a normal supply of water, and to meet this demand tanks for storage are absolutely necessary. With regard to the method of lime-burning, I am led to believe that the best result is obtained by making an excavation in the earth 10ft. by 10ft. by 6ft. This hole should be on high ground, so that in the event of wet weather the water can be drained away from the kiln. After having prepared the kiln, it is advisable to cart all the stone and wood required. This being done, proceed with the building of the kiln, by making a bed of leaves, bark, and dry twigs. Upon this place dry sticks, gradually increasing the thickness until you have a layer of heavy, dry wood. The stone, which should be moderately hard, can be broken on the layer of wood into the size of about 4in. Keep the stone to the centre, near the funnel used as a means of creating a draught. Do not put on heavy layers of stone. Cross the next layer of wood, which should be green logs, or preferably, roots, and now put on a heavy layer of stone, keeping it, as before, well to centre of the kiln. Continue placing alternately the wood and then the stone to the desired quantity. Finish with a layer of roots or logs on top, in order to burn the top stone. There need be little fear of melting the stone, as almost upon every occasion some few stones are not burned. I have obtained excellent results from stone brought to the surface by the plough, and would strongly recommend using this in preference to raising stone. If possible choose a calm night for burning, although it does not pay to delay simply because there is too much wind. Be guided by circumstances. If lime is required immediately burn irrespective of weather conditions. One great disadvantage with excavated kilns is the large amount of dirt which always falls in unless the kiln is walled. In building, place the largest logs or roots on the sides. This allows the centre of the kiln to burn out first, thus causing it to fall in, instead of spreading out. Ordinarily the kiln takes three or four days to burn out. The lime being ready, a start can now be made with the concreting of the tank, which has been thrown out, the walls of which should have a 2ft. 6in. batter in 7ft., 3ft. in 8ft. In throwing out a tank one must not lose sight of the fact that there is the same amount of evaporation from a 5ft. deep tank as there is from a tank of a depth of 9ft., so it is advisable to make it as deep as possible. My usual method of making concrete is to mix sand and lime in the proportion of two to one. A bay consists of 30 shovelfuls of sand and 15 of lime. This will take a fair size barrowful of stones broken to a 3in. gauge. The more mixing, the better the concrete will be. If, however, a farmer should have plenty of water, it would be as well to mix the sand and lime in the afternoon and mix the stone in with the mortar next morning. This will give the lime every chance to slacken during the night. I believe this to be the best way. Always put the bottom of the tank in first, with a thickness of

about 7in. of concrete. The continual walking on the floor will cause it to set, and seldom, if ever, have I seen any cracks there. As soon as the floor is finished start building the walls with a thickness of between 5in. and 8in. of concrete. The wise man will get as near the 8in. width as possible. Doubtless it will require far more material, but is it not policy to make a finished job of it than to be everlastingly patching it up? In a large tank I keep going round and round with layers of concrete; by the time the first layer is finished it will be set enough to proceed with the second. Very often the walls fall in owing to the concrete being put on when too green. This should be carefully avoided as it causes a serious waste of time, which possibly may be the means of missing a good rain. I consider it an excellent plan to build the walls of the tank to a height of between 6in. and 12in. above the ordinary level of the ground. This will allow of the walls being banked up with dirt to prevent water getting into the back, which often causes a great deal of trouble. After the concreting has been left to dry thoroughly, the next move is to begin cementing. For this purpose it is necessary to sieve the sand, which should be mixed with the cement in a two to one proportion. Unless one exercises care he is apt to make the cement too wet. This should be avoided, and in no case should too thick a coating of cement be used. The day following the completion of cementing, give the tank a cement wash, which fills up all the wind cracks. After this has been done put on a coat of coal tar before the cement dries, in order that the tar may penetrate farther into the cement and make a better wall." The majority of members agreed with the views and methods of the writer. The Chairman recommended that the concrete walls should not be less than 8in. thick. Mr. Riddle considered such a thickness to be a waste of time and material, provided the backing was sound and good. Mr. Oats (a visitor) also took this view, and stated that, provided the back was firm, 4in. was ample. A loose, uneven backing would require a thicker wall. Mr. Atkins mentioned the importance of not allowing the concrete to dry too quickly. Mr. Giles thought that if the bottom of the tank were rock, the concreting of the bottom should be left until last. The majority of members favored making several smaller tanks in preference to a very large one of, say 200,000galls. capacity, and agreed that stone should not be broken too small, and it was better broken before being put on the timber when building the limekiln. Mr. Riddle said that something in the nature of old sheet iron placed on the top of the kiln to keep the heat in would be beneficial. The best limestone available in this district was that with a pinkish tinge. Considerable doubt was expressed as to the possibility of striking water by well-sinking in the mallee scrub; no one had yet been successful, although it was admitted that very few farmers had made the attempt.

Elbow Hill, August 24.

PRESENT.—Messrs. Cooper (chair), A. Chilman, E. Wake, C. Jacobs, F. Wheeler, S. Wake, E. Story, C. J. Jacobs, H. Wheeler, F. Frieth, G. F. Wake (Hon. Sec.), and five visitors.

DIVERSIFIED FARMING.—This subject was dealt with by Mr. A. O. Chilman, in a paper, as follows:—"In an uncertain district such as this, with a scanty rainfall, it is not advisable to depend on wheat-growing alone. I consider this district an ideal one for stock-raising, providing rabbits are kept in check. There is a sufficient rainfall for growing feed, but the time of the rains is not always the most suitable for wheat. We could make far more use of the summer rains than we do. A dry autumn generally follows a wet summer, therefore we would do well to have about 100 acres or 200 acres of good fallow to sow with barley, oats, or other green fodders for fattening purposes. Take the summer and autumn that have just passed for an instance. We had from 3in. to 4in. during the harvest months, and with the favorable weather conditions that followed the farmers of this district could have fattened enough sheep not only to have supplied Eyre's Peninsula, but Yorke's Peninsula as well. At the same time they could have kept three or four cows in good condition, and secured the benefit of the high price of butter which always rules at that time of the year. We should also devote some time to vegetables, such as turnips, carrots, beetroot, and peas, all of which grow rapidly. These could be sown in a five-acre paddock well worked for the purpose. Any surplus over domestic requirements would come in handy for the pigs, and this kind of food is cheaper than wheat for this purpose. It does not pay to keep more pigs than can be fed properly. Two good sows and a good boar are enough for breeding. If there should be a shortage of feed, sell the young ones as soon as they are fit to wean. The poultry industry is a side line that is sadly neglected on most farms. The fowls are allowed to run wild; the roosters

are never changed, and the consequence is they inbreed, and the farmyard is soon overrun with mongrels and weedy specimens, which are neither use nor ornament. The hens make their own nests, lay a setting of eggs, and sit for three weeks on half-added eggs instead of fresh ones. They may bring out two or three chicks, or perhaps leave the nest before the incubating period has expired. If the poultry is neglected it will not pay. If farmers start with pure-bred fowls, and keep them pure, they will find that there is money in poultry. The Minorca comes first as a laying fowl, and then the White Leghorn. These two crossed produce a good table bird. On no account breed in, as this has a detrimental effect on poultry as well as on stock." Mr. E. Wake thought it quite probable that summer feed could be grown in the district. Mr. H. Wheeler advised the drilling in of oats on stubble land, to which the Chairman objected that horses would not eat them readily. Bare fallow was advisable. Poultry was a profitable adjunct to the farm, the best breed being White Leghorns. Hens should be discarded after their third year. Members generally favored rye and barley as green foodstuffs. The Hon. Secretary was of the opinion that lucerne could be grown for summer feed. There was a difficulty in disposing of fat stock at certain times of the year in this district.

Green Patch, August 26.

(Average annual rainfall, 26in.)

PRESENT.—MESSRS. F. Gare (chair), J. Sinclair, jun., R. Sinclair, W. M. McFarlane, E. Chapman, C. Parker, G. Sinclair, T. Freeman, and C. J. Whillas (Hon. Sec.).

TOP DRESSING CROPS WITH SUPER.—Mr. Parker had tried top dressing oats with super., but the crop had not benefited. Mr. Freeman was of the opinion that in this district the land should be better ploughed and cultivated, and that poor ploughing was the cause of many of the poor crops.

VINES IN BLACK SOIL.—Mr. McFarlane reported that he had found it necessary to root out about four acres of Zante currant vines. The vines had been planted at the bottom of a gully in black peaty soil nine years ago, and until two years ago had made splendid growth, and had supplied a good crop of currants each year. Through the heavy rains the water level had risen to within 2ft. of the surface, and this was killing the currants. Vines on the poorer higher ground were doing splendidly.

Shannon, August 24.

PRESENT.—MESSRS. Proctor (chair), H. Roediger, W. Wemyss, C. Wemyss, H. Proctor, A. Habner, W. Watkins, V. Gordon, and J. J. Cronin (Hon. Sec.).

FALLOWING.—Mr. A. Habner contributed a paper on this subject in which he stated that the land should be ploughed as early as possible in order to allow the winter rains to soak in. He would plough to a depth of 3in. This would disturb the stumps but not the clay. The fallow should be worked about the middle of September. This would give an opportunity of working it again before summer, and land so worked would not set down. To get fallow in proper order it should be worked three or four times, which sweetened it and stored up nitrogen. A good deal of attention should be paid to the milk thistle, because, if allowed to spread it was very hard to eradicate. If turned in deeply it would not come up again before the next spring; but if left on the surface it would grow with the summer rains. Sheep were invaluable for checking weeds, as it was an easy matter to destroy them after they had been fed off. Shoats were a considerable source of annoyance in this district. He had tried to get rid of them by ploughing, but they were as thick as ever. A stubble burn was the best means of riddance, and to facilitate this the land should be worked frequently, instead of being ploughed 6in. deep to get the stumps out. In the discussion which followed, Mr. C. Wemyss preferred to always plough deep and work the ground well, if weeds were on the land or not. It was necessary to obtain a good seedbed for the following year. Mr. H. Proctor believed in cultivating with a disc cultivator and then harrowing well.

Utera Plains, September 21.

(Average annual rainfall, 14in.)

PRESENT.—MESSRS. H. Venning (chair), J. and M. Abrook, W. Stephens, T. C. Hornhardt, G. Barber, F. H. Haywood, W. Lee, Hill, C. Binley, R. Hill (Hon. Sec.), and three visitors.

WATER CONSERVATION.—Mr. J. Abrook read a paper on this subject in the course of which he stated that the supplies of water in the district were limited in number and uncertain. In view of this it was advisable to provide artificial catchments such as iron roofs or cement floors. An inch over an acre amounted to 20,000galls., and a 14in. annual rainfall would supply 280,000galls. In discussing the question, members agreed that something should be done to influence the Government in the direction of providing artificial water runs as well as tanks.

SEEDING.—In reply to a query as to the best time to sow fallow land in a district where the rains were usually late in May, members generally recommended that this class of country should be sown with an early variety of wheat, somewhat later than it was customary to sow stubble.

Yabmana, July 27.

PRESENT.—Messrs. J. N. McCallam (chair), H. R. and A. McCallam, J. F., J. Y., and A. Robertson, G. W. Story, J. Penna, F. Schirmier, and M. K. Frost (Hon. Sec.).

CARE OF FARM REQUISITES.—In a paper on this subject the Chairman impressed on members the necessity of providing proper accommodation and protection for harness, implements, &c., used on the farm. The harness should be kept in a closed room, protected from winds, and should be oiled or greased at least twice a year. Neatsfoot oil and tallow fat could be used for the latter purposes, and this rendered the leather more pliable and it was less likely to crack. Continuing, the paper said:—"Everyone should be methodical. The cornsacks from which the seed has been taken should be well shaken out and hung over a wire under a roof, and just before harvest-time all holes should be mended. Sheepskins would often bring double the price if properly stretched and dried. All drying should be done under cover." In discussing the question members generally considered that neatsfoot oil had a tendency to rot the harness. Mr. G. W. Story said that suitable timber was scarce in the district. Jarrah posts and galvanized iron were the cheapest building materials. Mr. A. Robertson considered that a wall of brush or stumps was a harbor for rabbits. In reply, the Chairman said that a straw shed was more economical for new settlers. When farmers became established they could erect more expensive sheds and buildings.

Yadnarie, September 20.

PRESENT.—Messrs. W. L. Brown (chair), G. H. F. W., and J. Dreckow, J. A. Kruger, A. Spriggs, R. H. Parbes, R. B. Deer, L. H. Marston, C. J. Mowat, S. H. Pearce, J. J. Deer (Hon. Sec.), and one visitor.

HARVESTING HAY.—In a paper on this subject, Mr. Pearce stated that land on which hay was to be grown should be carefully cleared of stumps and sticks, in order that the progress of the binder might not be hampered. It was advisable to overhaul the binder some time before it was to be used. Wheaten hay was best cut when the straw was white up to the first notch. It should not be left until too dry, as the grain became hard, and very frequently had an ill effect on the horses. When oats were cut green they had a tendency to be somewhat bitter; the best time for cutting was when the straw was turning pink. A mixture of wheat and oats was best for hay. A farmer was well advised to have on hand a somewhat larger supply than he anticipated using in case of unforeseen happenings. Cut lines should be put through the wheat crops in order to prevent running through the ripe crop with the harvester. Strips should also be cut around the fences and sheds, and the stubble ploughed in, to act as fire breaks. Hay should be cut between two and four days before stooking, and remain in the stooks for from six days to 10 days. If stacked too soon injurious effects were likely to follow the feeding of the hay to stock. Before a stack was commenced, a good layer of logs should be put down, great care being taken to see that no holes which would allow of the ingress of rabbits were left. Stacks with round corners were to be preferred. If care were taken to keep the centre of the stack well filled, there would be no difficulty experienced through the rain soaking inwards. The roof should be constructed with the heads of the sheaves outwards. If a stack were required to stand for over 12 months, it was advisable to thatch it. Wherever practicable, the hay should be carted before reaping was commenced. If, however, the wheat ripened before the hay harvesting was done with, stripping should be got on with immediately. The stripper was best when used on rough or new country, as the chaff was saved, less difficulty was experienced with the mallee leaves in the machine, and the draught was lighter. The harvester should be overhauled some time before it was to be used, and

spare parts should always be kept on hand. The comb, especially, should be in good order. A 5ft. comb was quite wide enough for this district. When cool weather prevailed the speed of the horses should be increased but during hot days, they should be driven slowly. Neglect of the wind board was likely to result in considerable loss. A mixture of resin and oil, boiled, was very useful to apply to belts. When the bags were taken off the machine they should be stood in rows, to facilitate the work of sewing and counting. The wheat should be removed from the paddocks as soon as possible. In discussing the paper, members generally agreed that it was undesirable to sow wheat and oats together for hay. It was better to mix the two crops when chaffing. Castor oil was an excellent dressing for the harvester belts. It should be vigorously applied on the inside and outside of the belt after the day's work was done.

Yallunda, August 24.

PRESENT.—Messrs. F. Olsten (chair), T. Forrest, G. Provis, S. L. Dix, S. C. Fairbrother, A. Cabot, G. Gill, J. Winch, H. P. Cabot, W. Bryant, A. Price (Hon. Sec.), and one visitor.

POULTRY ON THE FARM.—The Chairman contributed a paper on this subject in which he stated that poultry was one of the best paying by-products on the farm. Considering the attention they got they paid equally as well as sheep. If farmers kept an account of the profit from fowls for 12 months the results would often be surprising. It was not so much noticed because eggs were generally taken to the store in small quantities and placed against the account. For wool from 85 ewes and wethers and 15 lambs he obtained £20 18s. The sale of eggs from 80 hens, besides the value of eggs used in the household, was £19 11s. In addition, he reared 100 chickens, which at five months old he valued at 1s. 6d. each. He sold several cockerels at 2s. 6d. each, which made a total of £27 1s. Leghorns were good laying fowls, but it was difficult to keep them inside the yards. He preferred the Silver Wyandottes and Orpingtons, as they were excellent table birds. To improve the laying qualities of the strain, eggs from the best layers only should be set. He did not favor cross breeding. In this district there was a shortage of lime, which was necessary to prevent the hens laying softshell eggs. Fowls running at large were freer from lice and were stronger than those kept shut up. They did a great amount of good if turned into a fruit garden, as they were excellent scavengers and cleared out insects. In the discussion which followed Mr. A. Cabot said that sheep were more remunerative, as they enriched the soil to a great extent. Members generally agreed that, although it paid every farmer to keep poultry, sheep were more profitable in that they helped very largely in keeping the land free from weeds.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Berri, August 31.

PRESENT.—Messrs. S. Phillips (chair), H. Wescombe, A. P. Wishart, R. Stahling, B. A. Arndt, F. R. Arndt, R. Roska, A. Symons, F. Symons, A. Jarvis, J. McGilton, W. H. Wade, and H. R. Antuar (Hon. Sec.).

PREFARING LAND FOR IRRIGATION.—Mr. H. Wescombe read the following paper:—“Having obtained possession of the land the average man wishes to secure some returns as soon as possible, and begins at once to prepare it for planting. So eager is the inexperienced man that he often overlooks many important points in preparing and laying out his holding. In view of the large area that will probably be thrown open for irrigation during the next year or two, too much cannot be said on this subject. There are two classes of land, from an irrigation point of view, i.e., the high land and low land. The former generally consists of more or less sandy soil, while the low lands are heavy and in many cases stiff clay. Therefore it is necessary to deal with these separately, and as we are more interested at present in the high land, I propose to deal with this first. Remove all stumps and large roots to a depth of at least 12in. Where suitable timber is found in cutting up the trees it should be used for posts and the balance carted

to some out-of-the-way place and stacked for firewood. Brush and other rubbish can be piled into heaps and burnt. The ashes should be scattered about before ploughing, otherwise a tree or vine planted at that spot will most likely fail to grow. My experience in using ashes is that they should be used in moderation, say, not more than 2yds. or 3yds. to the acre. In ploughing the land endeavor to break it up thoroughly to a depth of 6in. to 8in. If it is hard and dry it will not be possible to plough to a depth of more than a few inches. In this case plough again after the first rain or irrigation, if possible, and also run the harrow over it. After the first ploughing it may be necessary to do a certain amount of grading to enable the settler to irrigate his land properly. Avoid grading if possible, as it is expensive work; and it is not a good plan to remove all the surface soil from one particular place. In grading, consideration should be given to surface drainage as well as to the watering of the block. Should there be no natural outlet for the surplus water it is a good plan to scoop out a good size dam at the lowest part of the block, and after the flooding, if there should be any water lying on the block, this can be drained into the dam, where it will probably come in useful for watering stock. Should there be a small grazing paddock in the block, let it adjoin the dam, so that the dam will serve two purposes. The next consideration is the provision of irrigation ditches. In dealing with these, too much care cannot be taken to have them in their proper places. Some of the points to be taken into account are—(1) In what direction do the rows to be watered, run? (2) Will the rows be too long? (3) Will the rows have sufficient fall? (4) Are the rows too steep to water without washing the land? These points should be carefully considered before deciding where the channels are to be placed. If the rows are too long, say, over 7 chains in length, the top gets too much water before the bottom trees are supplied. The result usually is that in a few years time seepage appears in the lower parts of the block. If the water is run on the side of the hill without sufficient fall to enable it to run freely the land takes in too much water and this is likely to cause seepage. If the land is to be watered down a steep grade it will be necessary to water with a very small stream for each row, otherwise deep gutters will be washed out. In using a small stream of water the rows must be short, say 5 chains, or the water will take too long in reaching the bottom trees. If these points are noted, and the land is judiciously watered in after years, seepage will not appear to the extent that it has appeared in some of the older irrigation settlements."

(To be continued.)

In reply to questions, Mr. Wescombe said there was little fear of seepage if the rows did not exceed 7 chains in length, but 5 chains was better. Seepage in the older irrigation settlements was mainly due to the fact that the main channels were left for 10 or 12 years before being concreted; whereas, if this difficulty were encountered at Berri, it would be due to overwatering at the top of the rows. It was advisable to water across a hill, provided sufficient fall could be obtained.

QUESTION BOX.—A number of questions were dealt with. It was thought advisable to plant vine-cuttings where they were to remain if rooted vines were not procurable. But this should not be done on heavy land. Planting should be early if the water supply was assured. The best time for planting the main crop of potatoes was August and September, the most suitable varieties being Redskins and Up-to-date. Heavy cropping varieties of vines could advantageously be planted for distilling purposes.

Coonalpyn, September 26'

(Average annual rainfall, 17½in.)

PRESENT.—MESSRS. Wall (chair), Bone, Cronin, Venning, J. Hill (Hon. Sec.), and one visitor.

POULTRY.—Mr. E. E. Williams contributed the following paper on this subject:—"The best breed of fowl for the farm is the Wyandotte. Birds of this breed should be of medium size, with square cobby bodies, short legs, and small bone. They are splendid layers, especially in cold weather, laying fair-sized eggs, more or less tinted. Chickens are hardy and reach maturity early. The pullets lay early. They are unrivalled for general purposes, and for crossing with Old English and Indian game. The flesh and skin are creamy-white and of the finest flavor and quality. The question of the production of a fair-sized marketable egg is a consideration, and the eggs of the Wyandotte, especially in the first year, are on the small side, though they will usually reach the 2-oz. standard in the second year. Some dealers object to the small eggs, while others accept them without demur. Eggs should be graded, but, if the farmer has to suffer, the consumer should not pay as much for small as for large eggs. The cost of rearing chicks

is an important item, and the earlier the young cockerels are killed the better for the farmer. It is surprising the quantity and quality of flesh obtained from young cockerels. The cost of housing is important. Five-foot wire netting is a sufficiently high fence for this breed, although it is probably the most active and busy of the heavy breeds. In the *Journal of Agriculture* for July, in the article on Poultry Tick, Mr. Laurie says, *inter alia*, 'In the colder and wetter districts the tick does not thrive.' This coincides with the view of one of the best known poultry breeders in the State, who used a good deal of woodwork on his poultry houses. In the absence of tick it becomes possible to construct cheaper and warmer houses. A 3ft. wall as the back of the house would be of advantage. Scrub timber should be used in front, and built high enough to give sufficient slope for a broom-bush roof to be used. This provides a warm house in winter and cool accommodation in summer. The divisions could be made of stone or wire netting. Wire netting should be placed over the house at the front, in order to prevent the fowls flying out. The yard should be from 30ft. to 50ft. long by 10ft. wide, and with not more than 10 fowls in each. It will pay better to keep the fowls yarded, and provide exercise and variety of food for them. A good mash can be made as follows:—Chaff or greenfeed, including potato peelings and other waste well boiled, mixed with an equal weight of bran and pollard in the proportion of one of bran to two of pollard. Feed it in a warm state, not hot. Two or three times a week poultry meal in proportions mentioned in the instructions should be given. At mid-day give as much green feed as they will eat. The greater the variety the better. Grain should be given at night. The water should be changed frequently. Permanganate of potash in the water once or twice a week will be of benefit. Cocky chaff or manure should be given for scratching. Under these conditions fowls will lay all through the year, and will pay better than if running wild. Some time ago I kept fowls in a suburban yard, discovered the tick, and got rid of the poultry. Many months after I had occasion to shift the back fence, during which operation many of the palings became loose and had to be nailed on afresh. After nailing one or two, I noticed that blood was literally running down the palings, and on investigating I found the space between the palings and rails to be thickly populated by tick. After removing the fence I again kept poultry, but by placing all houses away from the fences and using as little wood as possible, I was not again troubled with the pest."

Parilla Well, August 1.

PRESENT.—MESSRS. J. E. Johnston (chair), G. Pahl, B. Pahl, W. and F. Foreman, D. and J. Ferguson, J. W. Johnston, J. S. Johnston, E. H. Leak, L. G. Neville (Hon. Sec.) and three visitors.

FALLOW.—In a short paper on this subject, Mr. J. E. Johnston expressed the view that in all districts where the rainfall was not high, fallowing was necessary for successful wheat-growing. The work should be carried out early, in order that the winter rains might be retained in the land. Usually it should be finished by the end of August. Sandhills and flats should be ploughed separately. The former were best ploughed down hill with the skim plough, the depth of work being about 3in. or 4in. Following working, the stumps should be picked and the land harrowed crossways. Sandy land should then be left until seeding, as over-cultivation usually resulted in drift. The flats could be worked with the skim plough with the mouldboards taken off. Harrowing should follow a rainfall. Sheep were very useful for keeping down the rubbish. In discussing the subject, Mr. J. W. Johnston said sandhills should not be ploughed to a depth greater than 3in. Land carrying a heavy growth of shoots was best dealt with by the disc plough. Mr. J. S. Johnston said sheep were necessary for keeping down the weeds, and they also helped to keep a dust mulch, which assisted in the conservation of moisture. Mr. L. G. Neville emphasized the importance of working fallow after rains in the spring, or during the summer and autumn.

Parrakie, September 21.

PRESENT.—MESSRS. A. J. Beelitz (chair), H. Deiner, C. Heinz, T. W. Randall, F. W. Gravestocks, J. G. Temby, C. E. Hammond, R. L. Beddome, R. G. Jose, F. S. Dayman, N. Good, M. Kildea, T. Lewis, T. Willis, J. A. Ferme, S. R. Good, J. O'Hara, A. C. Hamoister (Hon. Sec.), and three visitors.

POULTRY.—In a paper on this subject, Mr. R. E. Jose stated that all farmers should keep up to 200 laying hens and a few roosters, the majority of which should be killed

when chickens. The difference in sex could be noticed when the chickens were a fortnight old, and even earlier in the lighter breeds, such as White Leghorns and Minorcas. It was unprofitable to keep hens after two years of age. White Leghorns, Silver Wyandottes, and Black Orpingtons were the best breeds for laying. He preferred the White Leghorns, as they were non-sitters, laid large eggs, and were very easy to rear. They stood the cold weather better than the others, as their feathers were thicker. The houses should face the east and should be made of galvanized iron, which did not harbor vermin. Perches should be placed about 18in. or 2ft. from the ground for either light or heavy breeds. Fowls should be fed at least twice a day. The morning meal should consist of boiled wheat, or bran and pollard mixed. Epsom salts should be given in the food once or twice a week. This prevented them getting too fat. The evening meal should be given an hour before sunset, and should consist of sound wheat, with chaff or straw. This gave the fowls exercise before going to roost. Lucerne or maize should be grown and fed to them at least once a day in the summer, preferably at mid-day. Charcoal should be given to provide grit, which was scarce in this district. The drinking water should be kept in the shade, and changed frequently. He preferred hatching with an incubator, as the chicks were healthier than those hatched by a hen. Attention to the housing, feeding, and breeding would prove fowls one of the best paying lines on the farm. In discussing the paper, Mr. C. E. Hammond said he preferred White Leghorns crossed with the Orpingtons. Mr. F. W. Randall would rear roosters until they reached the age of six or eight months, and then sell them. Mr. F. W. Gravestocks did not favor pure-bred fowls. He preferred White Leghorns crossed with Buff Orpingtons, and he would keep hens until three or four years old. Mr. Jose, in reply, said the egg-laying competitions provided a proof of the superiority of the pure-bred fowls. Infertile eggs were better for export and had a better flavor.

Pinnaroo, September 21.

PRESENT.—Messrs. B. L. Harfield (chair), M. Beckwith, A. W. Burman, F. G. Bonnin, J. Docking, F. H. and R. Edwards, H. Fewings, L. M. Ferguson, H. C. Hill, W. H. and W. A. Kelly, C. Lee, F. Laycock, M. McCabe, E. H. Parsons, J. Scales, L. Small, W. Venning, P. H. Jones (Hon. Sec.).

QUESTION BOX.—The programme for the evening took the nature of a question box, and many items of interest were discussed. In reply to a query as to whether it was possible to improve the quality of cow's milk by altering the feed, Mr. F. H. Edwards considered that if good feed were supplied to the cows both the quality and the quantity of the yield would be improved. Mr. Parsons said the addition of bran to the ration resulted in a high percentage of butter fat, and Mr. Venning had obtained best results by using copra cake. The merits of the various breeds of cattle were discussed. Mr. Edwards thought it was of more importance to ascertain whether the cow came from a good milking strain than the breed of the animal. He also expressed the view that the feed of the cow had a great deal to do with the profit. Mr. Venning thought that the milking Shorthorn was the most suitable for this district, as it was readily saleable to the butchers for slaughter. Mr. Scales also preferred a large-framed cow, providing, of course, that the quality and quantity of milk were satisfactory. The Chairman considered the Jersey the most suitable. Mr. F. H. Edwards did not think sufficient manure was used by farmers in this district. As the nature of the land varied to such a degree he would advise each farmer to make experiments. He could not agree with all that had been said by the Director of Agriculture. When phosphates were first introduced he experimented widely. At Enfield, where they usually cut for hay, he always used lowt., but, for an experiment, had applied 2cwt. per acre. The extra super. had induced increased growth, and although the crop did not blight it was "fluffy," and so he thought it did not pay to apply heavy dressings. The Chairman mentioned that a farmer from the Adelaide Plains district, who raised fat lambs for market, favored heavy manuring as a means of increasing the grass yield. Mr. R. Edwards believed that a heavy dressing of super. improved the grass, but until it was possible to cater more for grazing lands, he did not think the scheme advisable. He was of the opinion that ½cwt. was ample for new land in this district. Mr. Venning thought they could not look upon Pinnaroo lands in the light of grazing, but he favored heavier dressings of manure than were customary. Mr. Bonnin had recently conversed with a northern farmer on the subject of obtaining a selection of seed from another district, and that gentleman had mentioned that he had been farming for 30 years and had not found it necessary to make any alteration in his seed. Other farmers in the same district had continued on a similar course for a lengthy

period. Mr. Venning preferred to select his seed from fallow or new land. He did not consider it necessary to make a change, as by so doing there was always a risk of getting an inferior sample and there was no guarantee of freedom from other wheats.

Renmark, August 26.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. H. DeWitt (chair), J. S. Huggins, M. B. Geneste, E. Cole, H. S. Taylor, L. Basey, R. Nuthall, H. D. Howie, C. J. Everard (Hon. Sec.), and one visitor.

SPRAYING SOLUTIONS.—Mr. Geneste reported that some of his Sultana canes were badly affected with oidium last year. He sprayed them with soluble sulphur in the early spring, and this year the canes were quite clean. Mr. Howie had delayed spraying until late last year, and some of the canes were badly marked. Mr. Nuthall had been successful in obtaining good results by spraying early and dry sulphuring later. Bordeaux paste was generally condemned by members, but all agreed that Bordeaux mixture was very good. Mr. Cole found that stock solutions of bluestone and lime would keep as long as desired, provided they were kept separately. When the lime solution was being made, the slaked lime, after being mixed with the water and treacle, should be strained. Mr. DeWitt expressed the view that the treacle caused the water to take up 17 times more lime than when the treacle was not added. Mr. Cole had secured good results from treating peach aphids with a spray of red oil. The first application was made early in August, and the second one a week later. Last year he had successfully dealt with the aphids with tobacco wash, but only after six sprayings. Mr. Basey suggested the use of paper painted with axle grease and carbolic, as a protective band for fruit trees against caterpillars.

DECAY IN ORANGES.—Mr. H. S. Taylor referred to the fact that English and Californian experience confirmed the opinion that decay in oranges arose from cuts or bruises on the skin. Messrs. Basey and Cole considered it necessary to wear gloves when handling this fruit.

Wilkawatt, August 31.

PRESENT.—Messrs. J. Ivett (chair), W. J., D. F., and D. Bowman, C. and T. Sorrell, J. W. and F. W. Altus, G. W. and H. Brooker, A. J. McAvaney, F. and B. Spackman, W. R. and M. Neville, M. Hayes, F. W. Gasmeir, B. Tylor, P. Rigney, P. Maher, W. J. Tylor (Hon. Sec.), and seven visitors.

POULTRY.—Mr. F. Spackman, in a paper on this subject, stated that in order to get together a good yard of poultry a great deal of care and attention were necessary. Good, warm, iron houses should be provided, as timber and straw tended to harbor tick and lice. Draughts should be carefully guarded against. For laying, White Leghorns were best, with Black Orpingtons next. Breeding pens should be provided for each separate breed, and eggs from the best only should be set. Inbreeding was not advisable. The birds should be regularly fed with small quantities, one hard and one soft meal daily being recommended, with green food such as cabbage, lettuce, or lucerne, always available. Cracked limestone or charcoal should also be provided generously. Nests should be on the earth, as the eggs were then able to draw up therefrom the amount of moisture which they required. Where the hens were sitting on straw, or in a box, the nests should be occasionally sprinkled with warm water. Sitting hens should be well fed. Generally the pure-bred hens would not be found the best mothers. Chicks and their mothers should be shut up for a few days after hatching, and fed on soft food for the first week or so. Bran and pollard mixed with skim milk was recommended, and sweet skim milk was most suitable for drinking. It was a good practice to add a little sulphur to the drinking water in summer, and salts in winter. In the discussion which followed Mr. Neville preferred the Black Orpington breed. He favored breeding in the spring time. Mr. Spackman said that some of his fowls had eaten a good deal of bonedust, and they had thrived on it. Members generally favored breeding all the year round.

STUMP-PICKING.—Mr. B. Tylor read a paper on this subject, in which he advised the setting aside of small areas on sandhills on which to stack stumps. These should be gathered up before seed time. It was essential to clean land intended for hay-growing, in order to prevent damage to machinery. The fire rake would usually effectively deal with small stumps after harvest, and very little trouble should be experienced with the machinery through these. On no account should the stumps be placed alongside a fence, or close to a road, because of the harbor they afforded vermin. Very frequently, also,

when the stubble was being burnt the stumps caught alight, and posts were destroyed. Where rabbits got into the stacks, they could easily be destroyed by erecting a netting fence around the heap.

SOUTH AND HILLS DISTRICT.

Cherry Gardens, August 27.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. W. Chapman (chair), T. Jacobs, C. Lewis, A. Broadbent, C. Ricks, A. R. Stone, J. Tozer, H. Jacobs, H. Lewis, A. Jacobs, J. Lewis, T. Jacobs, jun., E. Broadbent, S. H. Curnow (Hon. Sec.), and two visitors.

ALMONDS.—Mr. Burpee (a visitor) stated that some of his almond trees, although they flowered well, did not set a crop of fruit, and the foliage dropped prematurely. He had tried Bordeaux mixture, but the result had not been satisfactory. Mr. Ricks did not think almonds would do well except on limestone ground, but Mr. Curnow instanced cases of large crops being returned from trees on almost pure sand, which was borne out by Mr. Jacobs. Mr. Chapman found little good resulted from spraying almonds with Bordeaux mixture.

A RETROSPECT.—The feature of the meeting was a paper by Mr. C. Ricks, in which he traced the work done by the Cherry Gardens Branch since its formation 20 years ago. Reference was made to the influence the institution had exercised in the direction of improving agricultural and horticultural methods in the district, and mention was also made to various matters of public policy in which the Branch had played an important part.

Clarendon, September 3.

(Average annual rainfall, 33½in.)

PRESENT.—Messrs. A. L. Morphet (chair), J. Piggott, W. A. Morphet, A. and A. A. Harper, L. Masters, J. Wright, F. Sheidow, T. B. Brooks, J. Spencer, C. Mathews, A. Phelps (Hon. Sec.), and four visitors.

WATER CONSERVATION.—Mr. T. B. Brooks read the following paper on this subject:—
“In a dry climate such as ours, where little rain falls during the summer and autumn, stock may be seen suffering from scarcity of water, and farmers therefore lose valuable time carting water. Where a large number of iron-roof sheds have been erected close together, large underground tanks can be utilised to hold sufficient water for stock; but where large quantities can be conserved, dams are the cheaper means of storage. With a 5ft. buxscraper and with fair going, 100 cubic yards of earth per day should be got out. If the land is not too wet and boggy, and with a little scooping each season, an abundant supply for stock should be obtained and a fair amount might be used for irrigation. Large quantities may be stored by building banks across the gullies in places where the clay is good. The water could then be run through pipes to flats lower down where foddors could be grown for summer and autumn feed. This would improve property values by at least 100 per cent., and stock would not require so much hay or dry feed which, during seasons such as this, could be marketed at high prices. Every cubic yard of earth taken out of a dam provides space for 168galls. of water; and if 100 cubic yards per day are taken out there is a storage capacity of about 17,000galls. With banking across a gully the amount of storage will depend on the grade of land; but in all probability, where 100 cubic yards of earth is removed and placed on the bank, it will provide storage for 10 times that amount. Our average rainfall is 33½in., and if each farmer stored that quantity off 25 acres he would never be short of water, and his stock would not suffer during the long summer months.” In the discussion which followed, members generally agreed with the ideas advocated by the writer.

Gumeracha, July 30.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. J. Porter (chair), J. B. Randell, J. Monfries, A. Moore, H. Norsworthy, H. V. Lee, A. H. Cornish, and W. B. Randell (Hon. Sec.).

FODDER CONSERVATION.—Mr. J. Monfries read the following paper on this subject :—
“The present season should impress on every farmer the necessity of providing food for cows during winter, when it is always scarce in this district on account of the cold and severe frosts. There is nothing better than silage for cows and young stock. It is not at all likely that the conservation of forage in the form of ensilage will ever supersede haymaking, but its value for feeding purposes must steadily increase in favor where dairying is conducted to any extent. No artificial or conserved fodders can equal good grass. The most palatable and nutritious substitute, especially for cows in milk, is well-made ensilage. The character of the silage, to a large extent, depends on the class of crop used and the method adopted to fill the silo. In America and Canada initial difficulties have been overcome, and there are over half a million silos in use, and no dairy farm is complete without one. In Australia very few farmers have persevered sufficiently to master the details of ensilage-making, but a season such as we have just had should force our attention on to this important subject. The most convenient method of constructing a silo in this district is to cut into the side of a hill. This should be lined with single brick and coated with cement, the front wall being of double brick with a strong frame similar to a door frame built in about 4ft. from the bottom of the silo. The frame is made so that red gum planks 2in. thick can be placed in as the silo is being filled. The silo is oval in shape with smooth sides, so that the crop can be readily trampled down. The roof is constructed so that it can be taken off and put on as required. A silo such as this can be easily filled from the top, and when ready for use the ensilage can be taken out with ease by backing the dray in below and dropping the feed into it from above. There is no waste, as a layer can be removed each time from the surface of the pit. The crop must not be put in at too dry a stage, as there will not be sufficient moisture to produce fermentation, and the ensilage will therefore be dry and tasteless. Should it be dry, it should be watered while filling, but the ensilage will be of inferior quality. When filling the pit the crop should be thoroughly trodden in around the edges so that the upper portion, about 5ft. or 6ft. from the top, will receive sufficient pressure to ensure a proper fermentation and preservation, otherwise it will become mouldy and practically useless. When the pit has been filled it is advisable to cover the ensilage with damp chaff to the depth of a foot, and it should be weighted with heavy timber or kerosine tins filled with sand. Any vegetation that stock will eat in its natural state will make good ensilage. It is said cattle assimilate ensilage better than any other food, and the reason is that the change effected in the silo is nearly equal to that brought about in the first stomach of ruminant animals. It has been proved that by thoroughly cultivating and manuring the land, ample food for one cow can be grown on an acre by adopting the silo system. A mixture of oats, peas, wheat, and vetches makes excellent ensilage; and lucerne, if cut when just in bloom, cannot be excelled. Maize also makes first-class ensilage, especially if it is chaffed. An advantage in making ensilage instead of meadow hay is that ensilage can be made in wet weather. It is necessary to feed hay with it, however. Since using ensilage I have not lost a cow through dry bible; it keeps them in perfect health. With the aid of the silo an abundance of succulent food can be carried right through the year. In the dry months, from December until the end of April, when greenfeed is very scarce, the silo, full of fresh green fodder, can be opened and the cows will milk as in the spring. Ensilage will enable more stock to be kept on the farm. We cannot continue to keep our farms in a high state of fertility without stock, and we cannot keep stock profitably unless we provide feed for them during the dry months of the year. The silo will greatly assist in this direction.” In the discussion which followed Mr. A. H. Cornish said he had attempted to make ensilage, but on account of defective methods it had proved a failure. He was convinced, however, that it was a great help to dairymen. Lucerne, and also Scotch thistles if cut while young, made excellent ensilage. Mr. J. B. Randell had tried it some years ago, and was convinced that there was no question about the value of ensilage if properly made. Care had to be taken in regard to the temperature, as too high a temperature would cause it to burn and be quite useless. The heat could be regulated by the speed of filling the pit or building the stack. If sweet ensilage were needed a high temperature should be maintained. It was also necessary to guard against the material being too dry, especially so with the large hollow strawed fodders. He considered the best crop was meadow grass and also chaffed maize, the latter giving a yield of from 30 tons to 40 tons per acre if well grown. Cows were very fond of it. New South Wales experts did not look with

favor on lucerne as a crop for ensilage, but favored feeding lucerne hay and ensilage, which proved a perfect ration. With ensilage he believed in feeding hay, bran, and chaff. He also thought the pit system far superior to the stack, as there was far less waste. Mr. A. Moore had tried a small stack of maize which had turned out a failure, but he was convinced that the manufacture of ensilage was the best means of conserving fodder for cows. Mr. Norsworthy was of the opinion that it was very beneficial for dairy cows, especially during bad seasons when the natural herbage was short and scarce. Mr. Porter had tried ensilage-making on a small scale, putting down wheat and dandelion, from which a great deal of moisture drained, but the solid contents were in first-class condition. The size of Mr. Monfries' pit was 14ft. x 14ft. x 15ft.

Gumeracha, August 27.

(Average annual rainfall, 33in.)

PRESENT.—Messrs. J. Porter (chair), J. B. Randell, B. Cornish, A. H. Cornish, H. V. Lee, J. Monfries, and W. B. Randell (Hon. Sec.).

MANURES.—In discussing the benefits arising from the use of various manures, Mr. J. Monfries was fully convinced that land in the hills required lime. He had noticed that in one of his paddocks, where there was a small outcrop of limestone, the crops were heavier than elsewhere. Mr. A. H. Cornish had used as much as 2cwts. of bonedust per acre for peas, with no apparent increase in the crop, and the following hay crop showed no benefit. After a dressing of ashes the improvement was wonderful, being evident for fully five years. Some years ago he had tried Thomas phosphate with no appreciable results. Mr. B. Cornish said that many years ago a light dressing of salt had been applied to his land with good results. He believed in bonedust. At first he used 2cwts. to the acre, but found better results followed when 1½cwts. were used. Land in this district needed more rest, and should be ploughed every two years. Weeds could be kept down by scarifying. If the soil were well stirred up and exposed to the sun it would give better results. Mr. Lee had come to the conclusion that the hills land was too wet, as a rule. He had tried commercial manures during wet seasons without good results, and during dry seasons, with no manure, he had obtained good crops. Mr. W. B. Randell remarked that during his two years' experience of farming in Gumeracha he had found the best results followed a crop of peas with a dressing of 1cwt. bone super. to the acre.

Hartley, August 24.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), J. F. Tydeman, W. Bermingham, J. M. Hudd, W. Brook, S. Pratt, F. Brunes, G. Hill, W. Richardson, J. Stanton (Hon. Sec.), and four visitors.

HOW TO MAKE MEETINGS MORE ATTRACTIVE.—In a paper on this subject the Hon. Secretary pointed out the value of the Bureau as a means through which farmers could approach the Government, which looked for opinions from the various Branches on matters of moment in the districts in which the Branches existed. Necessary advice on agriculture could be obtained from experts through the medium of the Bureau. Although a great deal was gained by the interchange of opinions at the meetings, there was sometimes a lack of business-like methods. When a subject was before the meeting for discussion, the Chairman should call upon the members to speak, instead of allowing them to speak at will. This would have the effect of inducing members to take keener interest in the subject. New members were sometimes backward in discussing a subject, and this frequently resulted in their losing interest in the meeting. In the discussion which followed members generally agreed that if the ideas expressed were carried out, more interest would be created in and good done by the various Branches.

FIVE YEARS AS HON. SECRETARY.—Reference was made to the fact that Mr. W. Bermingham had held the position of Hon. Secretary to the Branch for the past five years, during which time he had rendered much valuable assistance to the Bureau.

Ironbank, July 26.

PRESENT.—Messrs. G. Pole (chair), C. Morgan, E. Coats, C. Coats, S. D. Evans, R. Coats, C. J. Hill, W. Slater, F. S. Coats, F. Brown, L. G. Ahrens, and W. Coats (Hon. Sec.).

ARBORICULTURE FOR THE HILLS.—The following paper was read by Mr. C. J. Hill :—
“Afforestation claims our serious and immediate attention. The work of vandalism goes on despite the pleadings of a patriotic press. Certainly the hills are not being denuded of trees in the same manner that open and undulating country is, but scarcely a thought seems to be given to the reservation, much less the planting out, of suitable timber trees any more here than there. Nowhere is the scarcity of timber more perceptible than on the farmsteads of the hills; in every direction one is confronted with the serious fact that all exposed woodwork is wearing out—decaying, tumble-down yards, sheds, field and garden fences are met with in every locality. Culverts, bridges, and all outside woodwork have to be renewed within a generation or two from the time of construction. The good price obtained for firewood forms a severe temptation to turn valuable timber trees into ready money, in the absence of a ready means of converting them into sawn timber. It is regrettable that the art of pit-sawing is an almost forgotten one in many places, but it presents no insuperable difficulties to persons accustomed to the use of tools. Nearly every farm or garden has a few trees or dry logs lying about in the way. The farmer, with the help of his sons, or the boys themselves, during the winter months, by the outlay of about £2 can purchase a sawyer's plant by which very rough-looking stuff can be converted into the most useful material, because for durability, the trees of the tiers yield a timber that cannot be beaten anywhere. Our much despised stringybark, for instance, will stand in the ground better than most imported timbers, but above ground, nothing that we import can approach it. I recommend the good old-fashioned pit-sawing because of the inexpensiveness of the plant. Certainly no one, unless in possession of a forest of trees, could afford to erect machinery. This is not considered a timbered country, therefore the farmer is unable to run off with a few logs to the mill and return home an hour later with a load of timber. I notice that beautiful young gums (which term comprises stringybarks) are being mercilessly slaughtered for firewood. The district councils are censurable for not conserving, for their own future use, good sound young trees; it would be an easy matter to send a practical man to mark trees for reservation against the vandalism of the scrub-cutter. Seeing all these things, is it not our bounden duty to provide and conserve timber patches for our own and the next generation? I say our own advisedly, for a pine, of the right kind, and many indigenous hardwoods can be cut into timber from 20 to 40 years from planting, to say nothing of the immense benefit in ornamentation of properties, and for cattle shelters. Now is the planting season, and it is my purpose in this paper to name those varieties that I think most suitable for waste lands of the range country generally, and for our own locality particularly. There is a brief interval just now, before the hum of gardening begins, and I desire to impress on you the vast importance of this matter to ourselves and our successors. Do not lay out large plantations, that are sure to be neglected, but make it your annual duty to put in, say a week, at planting, protecting, trimming, and training those set out in previous years. One would suppose that those kinds that are indigenous to each locality would be the best doers, being born to those conditions, but experience does not bear out this supposition in every case. For instance, the Tasmanian blue gum grows much more rapidly in the ranges of this State than our own blue gum; likewise the sugar gum, although a habitat of the elevated country of the middle north, more readily adapts itself to the steep, rugged spurs of the Mount Lofty Ranges than the red gum does; and all of them grow much more rapidly in South Africa, California, and all other countries where the growing season is also the rainy season. Although our blue gum is a very superior timber, excelling in hardness, strength, durability, and weight, it is a slow grower, having many natural enemies, the worst of which is the parasitic mistletoe. Let the blue gum grow where it is at home—on stony spurs, with marly clay underlying, and having a northern aspect, but for planting out artificially, let it be the Tasmanian variety. Red gum cannot be approached for durability, but it is at home in undulating country and in flats at a considerable altitude, but for steep, shady hillsides the sugar gum is better, but I have yet to learn whether or not the timber resists the white ant as the red gum does. The calophylla of Western Australia, though not equal to our *rostrata*, is a stronger timber, and better suited for beam work, and would, perhaps, do in the ranges here, being a hardy tree, tall and rapid of growth, and requiring moisture, such as our hills afford. I wonder our Forest Department does not supply this tree, also the *toort* gum, which ought to do well in dry situations having shallow subsoils, in fact, growing strongly where other eucalypts fail. If there is any part of South Australia suitable for the jarrah it should be on gravelly spurs south of Mount Lofty, as the dry northern winds are considered inimical to its growth, and the moisture-laden air from the south is congenial. The same conditions apply to the karri gum of Western Australia. Of Victorian timber trees the almond-leaved stringybark (*messmate*) should certainly find a home in the tiers. It is, probably, the most useful timber tree of Victoria,

and although the obliqua and capitellata are of almost equal utility, and are properly valued in that State, yet here, where they both do well, especially in steep, shady, and uncultivable situations, they get a bad time, being considered fit only for firewood. Where these eucalypts grow naturally they should never be sacrificed for imported varieties, but should be thinned out and protected from bush fires—their greatest enemies—and in 25 years' time they would yield fine shapely 'sticks' for the sawyer, equal to anything in the world for rough beam and outside work. These timbers have not had a fair deal—any kind of treatment is considered good enough for a 'stringy.' In cutting these logs, the boards should never be ripped out on the back, that is, at right angles to the quarter grain, but should be ripped out in a direction, as near as possible, with the quarter cracks. Boards cut like this never buckle. Flitches should be stacked, and ripped into smaller stuff when needed, and they will come out, and retain, quite a different appearance, that is, clean and fresh, instead of stained and dirty looking—the condition in which they are invariably found, particularly in the form of fruit boxes. Another Victorian tree—the mountain ash—should find a congenial habitation here. It yields a stronger timber than the stringybarks, is free from gum bladders, and is largely used in South Australia for wagon work. Of an almost infinite variety of woods of New South Wales, some three or four kinds of ironbark take first place for outside work. It is the only timber that approaches South Australian blue gum, but I am of opinion that the tree would not succeed in Mount Lofty country, but it should in range country of the north, unless there is insufficient humidity in the atmosphere. Of the half dozen kinds of pines supplied by the Forest Department, there seem to be only three suitable for timber, viz., Remarkable, Canary Island, and Longifolia; these are handsome trees, and vigorous growers, delighting in the cold. Experience teaches that the Remarkable is, every time, the best to set out for timber purposes. For box ends pine is indispensable. The Remarkable pine will grow and flourish everywhere in the ranges, and even on the roughest land. On strong land it grows branchy, therefore, instead of planting close to induce height and slenderness, it is better to give room and trim off the lower branches as the top moves upward, but do not check the tree by severe lopping. The callitris, or native pine, grows slowly, but on poor sandy ranges and hillocks of the drier parts, it flourishes. It yields a wonderfully durable timber for general carpentry and outside bush work, completely baffling the white ant; its cultivation, therefore, should be encouraged by the Government for telegraph poles. I would like to see the native pines of Eastern Australia taken on by our very worthy and active Conservator of Forests, and tried in the north of this State; they should be always planted or sown on ridges or mounds, for that is where they are always found. The *Cal. robusta* grows tall and straight as a candle. The oaks of my acquaintance, though affording the toughest of timber, have poor fissile properties, and are most difficult to work. They are not particularly at home away from sandy river banks. Therefore, I recommend the native pines as being of paramount importance to arboriculturists."

Ironbank, August 23.

PRESENT.—Messrs. C. Moigan (chair), J. Morgan, S. D. Evans, L. Ahrens, G. Pole, F. Brown, W. Coats (Hon. Sec.), and two visitors.

BEANS.—In a paper on this subject Mr. F. A. Coats said the best time for planting Canadian or French beans was from September 30th onwards, when the soil had become warm. Bonedust should be sprinkled on rows 26in. apart after the ground had been dug, and then hoed in with a fork hoe. The drills should be drawn out with a hoe to a depth of about 6in. Into this the beans should be dropped at intervals of between 3in. and 4in., after which they should be covered with fine soil. The plants would be up in three or four weeks to a height of about 6in. They should then be fork hoed to a depth of 4in. or 5in., care being taken not to disturb them. Banking served the dual purpose of providing a channel for water between the rows and a guard against the wind breaking the heavily-laden stalks. Early in the season watering should be confined to alternate rows, but when the weather became hot or dry the plants should be watered weekly. The crop should be picked twice a week, and water should be supplied on the day following every other picking. Beans should be carefully protected from wind and snails. In discussing the subject Mr. Evans contended that super. was better than bonedust for this vegetable. Mr. Brown believed in planting two rows 1ft. apart and then leaving a space of 3ft. Mr. J. Morgan would only plant the beans 1in. deep, and some of the members would put them 6in. apart in the rows.

Kanmantoo, August 29.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. A. W. Hay (chair), J. Shepherd, W. Shepherd, W. Downing, H. G. Pym, E. Shepherd, R. Talbot, L. Wooley, R. Downing, S. Downing, A. Mills, T. Critchley, W. Mills (Hon. Sec.), and four visitors.

STABLES.—In a short paper on this subject Mr. H. G. Pym stated that the first consideration in connection with the erection of a stable was the position. For the particular district in which he resided the usual practice was to have the back of the stable facing the east, and wherever possible the building was put on the side of a hill with the back down hill, in order that refuse soaked away. Each horse should have a separate stall, and pegs should be provided for the harness. The stalls should be not less than 6ft. wide, and wherever possible the building should be constructed of stone with an iron roof. The continuous recovering necessary where straw was used for roofing outweighed the advantage of more even temperature which it gave. In addition, the iron roof provided a good catchment for water, and there was not the danger of fire that existed in the case of the straw roof. The occasional application of an antiseptic was recommended and regular cleaning out of the stables advised. In discussing the paper Mr. W. Downing expressed the view that 5ft. was quite wide enough for the stalls.

Longwood, August 24.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. W. H. Hughes (chair), G. W. Doley, J. Roebuck, E. A. Glyde, J. C. Blakley, A. F. Furniss, H. Vogel, J. R. Coles (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—The homestead of Mr. G. W. Doley was visited. The orchard was inspected and various matters of interest discussed. Mr. Filling had successfully dealt with club root by dipping the roots of trees before planting into a mixture of equal parts of lime, soot, and wood ashes, in water. Mr. Blakley tabled Egyptian clover 12in. in height, it being the second cut. The seed was sown on April 8th, and the first cut had been 16in. high.

MacGillivray, August 27.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, J. Matthews, A. J. Nicholls, H. E. Petras, A. Stirling, sen. and jun., and H. E. Williams (Hon. Sec.).

BLACKSMITHING.—Members and their families attended at the homestead of Mr. Stirling, where the host gave a practical demonstration and lecture on blacksmithing. He first showed the difference between good and inferior coal, pointing out that the latter made more clinkers than the better coal. Fine gauge coal was desirable. When pointing iron it should first be tapered on the square; haphazard hammering caused the material to split. Tempering chisels, both for iron and wood work, was demonstrated. After heating the steel, rubbing it on the ground cleaned the surface and enabled the smith to better see the tinge of color as it spread towards the point. In the case of a cold chisel the plunge into cold water was made immediately the bluish hue reached the cutting edge. In the event of the edge being jagged, the temper should be taken a trifle sooner, and the tool then ground back to the tempered zone. When a wood chisel or plane-iron was removed from the fire it could be dipped into cold water immediately and withdrawn, then placed on red hot iron until the straw shade appeared. Cooling off when this reached the cutting edge gave the required temper. In preparing for a weld both pieces of iron should be dumped before fashioning the scarfs. These should be sloped back a distance equal to the thickness of the bar. A cross-cut put on the scarfs prevented the pieces from slipping when struck by the hammer. The hammer first dealt with the two fine ends, locking them into the butt of the opposite scarf; and then the middle was easily done, provided no side blow was struck before a firm union was effected. Any bulge remaining might either be worked down or wasted off in the fire. There was a difference in wasting and burning iron, hence the operator must open the fire in order to watch that the former stage was not exceeded. Another style of preparing for a weld could be adopted when heavy work was on hand, and this consisted in pointing one bar and making a dish in the other to correspond. The joint might be effected either by fusing them in the fire or they could be forced together otherwise. The correct heat for each weld was shown. Eyebolts were left small in the eye until welding was completed, after which, by forcing a round bar through the opening, it was easily enlarged.

Square heads for bolts were simple to make if any old nuts were available. Another way of putting a head on a bolt was to put it in the vice whilst it was hot, holding it just tight enough to avoid pinching, and tapping the head down. For making a square beneath the head the bolt needed to be held in a piece of iron having a square hole of the required size. The sharpening and treating of augers was explained. Some users ground the round of their augers from the cutting spiral upwards, leaving the diameter of this slightly greater than the ground part. By doing so it was found that less trouble occurred on account of the tool jamming. Putting cast iron on wearing surfaces, such as the points of ploughshares, was shown. After making the share hotter than the thin cast iron, the two were placed in contact and kept so until sufficient of the iron adhered to the share. When cooled the part so treated gave a surface of great hardness. Corns in horses' hoofs were almost invariably found on the inside. When shoeing such hoofs the wall should not be cut away unless the bearing happened to be too forward. By leaving this a foundation was provided for the shoe, which thus acted as a protector to the corn. The corn should be cut away. A horse with its front feet deformed was exhibited. The trouble was due to the animal being unable to stand up during a protracted illness. One way to prevent such a development was to stand the invalid in water for a period of several weeks before malformation had a chance. Another method was to bleed the feet from an incision made at the apex of the frog. When horses were being shod it was advisable to clean the frog to see if any foreign objects such as pebbles or stakes were present. Some members shod their horses and others never found it necessary to do so. Reports were made of horses rubbing against fences and other fixtures. One member had found what appeared to be a species of flea on his animals. He had resorted to combing with a very fine comb, followed up by applications of kerosine. This treatment eased the trouble, though no permanent riddance had yet been effected. The horse which had been most badly infested lost condition until the apparent cause had been combated, since when it had improved. The garden, where provision had been made against wind by the erection of brush fences, was inspected.

Meadows, July 29.

(Average annual rainfall, 34in.)

PRESENT.—Messrs. C. Ellis (chair), T. B. Brooks, J. Catt, W. J. Stone, S. Smith, W. Nicolle, Jas. Stone, F. Nottage, H. A. Kleemann, A. L. Ellis, W. H. Bertram (Hon. Sec.).

FODDER CROPS.—The following paper was read by Mr. H. A. Kleemann:—"The difficulty of providing fodder for stock during the cold winter months may be overcome if systematic efforts are made to grow summer fodders for green feed and for ensilage. Farmers everywhere are beginning to realise that slipshod methods of feeding stock will not do, and that the only way to improve the quantity and quality of animal products is by raising forage crops. The object, of course, is to supplement the natural pasture by raising succulent food at a time when that class of feed is scarce. It is to the small farmer that the growing of forage crops should appeal strongly. Men on small holdings must turn their attention to this phase of agriculture, as it is only by adopting methods of intense culture that they can hope to be successful. Both for dairy farming and the raising of fat lambs, forage crops are of the utmost importance. It is necessary, first of all, to consider what crops are most likely to suit the climatic conditions of the district. Let me first of all take lucerne. It is a splendid winter feed in the form of hay, chaff, or ensilage. It should be sown when the severe frosts are over. One of the best kinds to grow is Hickory King. It has been proved that five acres will keep 20 cows in full profit all the year round, providing either ensilage or hay is available for the winter months. At Wood's Point, at Messrs. H. W. Morphet & Co.'s farm, several hundreds of dairy cows are kept, and they are mostly fed on lucerne. There is a steadily growing demand for lucerne hay in South Australia, and this year at the Murray Bridge Experimental Farm only one-quarter of the orders could be met. The yield varies from seven to 12 tons per acre yearly. An annual yield of 10 tons per acre at £4 per ton would bring in £40. If a farmer grows more than he requires, he can readily convert the surplus into cash. Some say that lucerne taints the milk, but if it is allowed to wilt a little before feeding, this is not so. It is also good for pigs and poultry. Maize is a strong, vigorous plant that grows rapidly through the summer months. It can be fed as a green fodder without any fear of ill effects, and it also makes the best ensilage. At Messrs. Kirkham's dairy farm, at Ashbourne, it is extensively grown and converted into ensilage in an overground silo. Maize is susceptible to frost also, and should be sown in October. It should produce at least from 10 to 15 tons per acre at Meadows. Dairy farmers would be well advised

to grow a certain acreage of maize every year, as a safeguard against a dry season. To harvest a crop of maize, throw it into a silo, as the bulk of the crop is ready at one time. It is quite certain that farmers will have to conserve forage in the form of ensilage to a far greater extent than they do at present. It has been proved that both lucerne and maize can be grown here, and as every farmer here keeps dairy cows, the growing of these crops will enable them to stock more. The work of feeding and milking have to be done at present, and it will only entail a little more time in looking after the extra cows. Sorghums are likely to have a much larger range of cultivation than maize, though where maize can be grown, it is preferable as a fodder crop for several reasons. Maize is a richer and stronger plant, and it makes a better class of green fodder and silage, and there is not the same danger in feeding it green as there is in the case of sorghum. Sorghums have the advantage over maize that they give a good second growth, whereas with maize, unless it is irrigated, there is very little second growth. Sorghum grows well in light soils, and will stand a severe drought. The cultivation necessary is similar to that for maize. At certain stages of its growth it is dangerous to give to stock. It loses its poisonous properties in a few hours after it is cut and stacked, or placed in a silo, and is also safe to feed after the seed begins to form. It gives two or three cuttings a year, and also provides feed just at the time when the paddocks are bare. Mangolds constitute the best winter fodder for dairy cows. They are an expensive crop to grow, on account of the thinning and handling involved. They stand the cold well when the full leaf stage is reached. When ready to harvest, they should be pulled—never cut—and they should not be tailed. If properly stored away, this fodder would stand through the winter months, and feed well in the summer. They do not taint dairy produce as turnips do. Rape is the best fodder for fattening stock. It can be sown in the autumn or spring, but it must be sown on land that is in good heart. It does well on land that has carried a crop of beans or peas. Kale has several advantages over rape. It stands right through the season and the following winter, and comes again very early in the spring, when feed is scarce. With kale there should be 2ft. or 3ft. between the rows, and the land should be well worked. It should be sown in spring, and fed off more lightly than rape. Not much special attention is required, but, of course, in common with anything else, it does better with good cultivation. Of the millets, the Japanese is the best. The cultivation required is similar to that for sorghum. If cut early in the season it gives a second growth, and seed should be sown at the rate of 2lbs. or 3lbs. per acre. Rye is a good early green fodder, but it is not much good for hay. Oats and barley mixed, sown early, also gives good results. Mustard grows very fast. It is a good food for cold weather, but the stock should be put on early, before it becomes too strong. Some of the crops I have mentioned are grown here, but only on a small scale. More must be done if this district is to take its place as a dairying centre. The necessary rainfall is forthcoming, and it behoves the farmer, if he wishes to keep abreast of the times, to experiment more. Every farmer should try at least one experiment a year, in order to ascertain what his land will produce. He will not only benefit himself, but will provide object lessons for others in the district." Members generally agreed that the cultivation of fodder crops was neglected to a large extent in the district. The Chairman was of the opinion that maize was better for ensilage than for green feed. Members were agreed that lucerne was a first-class summer fodder, but it would not grow in the winter months on account of the cold. Lucerne flea also was troublesome in the early spring.

Meadows, August 26.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. G. Ellis (chair), J. Catt, W. Nicolle, J. Morriss, T. B. Brooks, S. Smith H. A. Kleemann, A. L. Ellis, J. Stone, F. Nottage, and W. H. Bertram (Hon. Sec.).

CONSERVATION OF WATER.—Mr. F. Nottage read the following paper on this subject:—"The non-appearance of the usual rains last autumn has caused farmers to consider what provision should be made for conserving water for such a late winter as the one just experienced. Being accustomed to an average rainfall of 35in. in this district the farmers have become somewhat careless, and the result has been, where insufficient rainwater tanks and dams for stock have been available, water carting had to be resorted to, which involves a considerable loss of time and labor. When one considers that an inch of rain on an acre of ground amounts to over 22,000galls., some idea may be gained of the immense quantity of water that goes to waste when the ground becomes thoroughly saturated. By the construction of dams, a part of this can be conserved for use during the hot weather and when no rain falls. A suitable place in a gully where it only requires

a substantial bank to be made should be chosen for a dam. With the aid of the plough and scoop this should not be a very long or costly undertaking. The common red clay of this district is excellent for holding water. A dam an acre in extent would be sufficient to irrigate several acres of ground for the growing of fodder crops for stock, and would supply the wants of the natural feed, which has suffered severely this year. In the past the farmers of this district have depended too much on the natural herbage, consequently, when a long spell of dry weather comes, cattle, in particular, become very low in condition, and the milk supply suffers accordingly. There is no doubt that irrigation will have to be resorted to if the farmer wishes to make the best use of his land. There is always the possibility of a late season." In the discussion which followed members agreed that not enough attention had been given this question on account of the high average rainfall. Mr. J. Morriss thought it a mistake to construct a dam in a place where the water lay in winter, as it would silt up too quickly. He intended to sow half an acre with lucerne in October, and irrigate it with the aid of an engine, pumping plant, and sprinklers.

Morphett Vale, August 27.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. A. C. Pocock (chair), F. Rosenburg, A. Anderson, T. Higgins, J. Perry, H. O'Sullivan, L. F. Christie, A. Connole, W. Goldsmith, E. Perry, H. V. Sprigg, T. Anderson, E. E. Hunt (Hon. Sec.).

FEEDING PIGS.—The Hon. Secretary reported excellent results from feeding a sow and litter on equal quantities of bran and pollard, mixed with milk to a thick slop, and left standing for a few hours.

MANGOLD WURZEL.—Mr. Pocock read a paper on this subject, in which he stated that mangolds were an excellent crop for the southern districts, and their value was not fully realised by farmers. The best varieties for field cultivation were the Oblong and the Globular, with sub-varieties of Red, Orange, and Yellow. Six pounds of seed per acre should be sown in August or September. They were better suited to stiff soils and a comparatively dry climate. The seed should be steeped in water before sowing, and plants could be transplanted in order to fill up any gaps. The seed should be sown to a depth of about ¾in. to 1in. and about 12in. apart. A dressing of from 3cwt. to 5cwt. per acre of salt was most suitable, but green stable manure should never be used, as it caused the roots to grow forked, thereby reducing their value and increasing the cost of gathering and cleaning. Root crops should only be planted on land made rich by manuring. The land should be ploughed early and deep, worked to a fine tilth, and kept free from weeds. Mangolds should be pulled before they went to seed, and should be stacked and covered with straw.

Port Elliot, September 21.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. H. B. Welsh (chair), J. Chibnall, J. Brown, H. Welsh, H. Green, and W. E. Hargreaves (Hon. Sec.).

CANNING AND DRYING FRUIT.—Mr. W. E. Hargreaves read the following paper on this subject:—"Sugar is not necessary in canning fruit, but is used as a syrup flavoring. A syrup made of 4lbs. or 5lbs. of sugar to 1gall. of water is sufficient generally. The fruit should be just ripe and sound, not bruised, and quite freshly gathered. Decay is caused by organisms which cannot live longer than a few minutes if the fruit is subjected to a boiling temperature for a time. The fruit must be sealed up hot, in order that living germs cannot gain admittance. The air is loaded with germs of moulds, mildews, ferments, etc., therefore canned fruit must be used within a reasonable time after being opened, or it will spoil. When glass jars are used, and they are the best, a folded cloth on the bottom of the boiler, and one also between the jars, will prevent breakage. Before filling, place the jars in a boiler of cold water, and bring them to a boil on a slow fire. Take the boiler off the fire, and let it stand until cold. This will temper the jars. Then fill them with the fruit and syrup, and stand them up to the neck in the water, with the cloth under and around, and bring the water to boiling point on a slow fire. Then fill them to the top with hot syrup. As soon as the fruit is done, close the jars tightly. Dip their heads in melted beeswax before they are cold. A kerosine tin with one side cut out makes a good boiler for canning small lots. If larger quantities are to be done, have three or four boilers. Some fruits require more boiling than others, but do not boil the

fruit too long, or some will crack and spoil the appearance of the bottle. Apricots halved, with the stones removed, only need about six minutes; apples quartered or halved, according to the size, about 12 minutes; grapes, 10 to 12 minutes; strawberries, 10 to 14 minutes; pears, halved or quartered, 18 to 20 minutes; plums, 10 to 12 minutes; peaches, halved and stoned, eight to 12 minutes; cherries, six to seven minutes. On no account should they be boiled on a quick fire, or the jars will crack and the contents spoil. A little practice will soon teach one more than a lot of reading. Drying fruit is one of the easiest ways we have of preserving. The greatest mistake to be guarded against is overdrying. The drying is completed when no water will squeeze out of the fruit. Apples should be peeled and cored, and either left in rings or slices. If one wishes to keep the apples white when dry, drop them into a weak brine of about 1lb. of salt to 8galls. or 10galls. of water, as soon as they have been peeled. This keeps them white until they can be sulphured. Then the white color is permanent. Place the apples on the trays made to fit the sulphur box, and then a few live coals of fire in a tin under the trays in the box. Put the sulphur on the coals, and shut the box up for 15 to 20 minutes. After this either put the fruit in the evaporating machine, or dry in the sun if the weather is warm. Apricots should be ripe, but not soft. Cut them in two and take out the stones, and lay them on the trays cut side up, and sulphur the same as for apples. Leave them in the sulphur box for 60 minutes or so. Sulphuring is not necessary; it gives the dried product a bright color, at the expense of the flavor. The Dutchess pear, known as the William bon Chretien, is a first-class fruit when dry, and is the best pear we have for the purpose. It should receive the same treatment as the apple, only the pear is not peeled. Cut the fruit into two or four, according to the size and the weather, and sulphur the same as apples. The drying of prunes and plums is simple. Never dry a plum with a sour thick skin, such as the Diamond and Egg plum. They do not dry well, and are very sour, even when dried. The Pond's Seedling, Green Gage, Orleans, and several of the sweet plums, are among the best. The Silver prune, Italian prune, Prune D'Agén, and the French prune are the best. All these, but the Silver, are dark. Where drying is carried out on a large scale, the dark plums and prunes need not be sulphured. Light or yellow fruits for sale should be put through the sulphur box. The prunes should be ripe. To pick them in the right stage will necessitate going over the trees two or three times. The prunes are not all ready to pick the same day, and green, under-ripe fruit is worthless when dry, and will spoil the sample. To hasten the drying process, dip them in a boiling lye for a few seconds. Then dip into a cask of clean cold water to wash the lye off. The lye causes a lot of small cracks in the plum, and it therefore dries much more quickly. If the weather is warm this dipping process is not needed. Prunes for sale should carry a nice gloss, and to get this, when dry they should be put into wire baskets, and dipped into a tub or cask of hot clean water, with olive oil or glycerine floating in it. Then spread them out to dry. This will also kill all insects. The peach is dried with the same process as the apricot, only some kinds require to be peeled, or their woolly skin spoils the taste and appearance of the fruit when dried. If a few of our largest growers went into the drying business we should not hear so much about glutted markets when our stone fruit is in season. Dried prunes, apples, and apricots will sell well when the glut is over. Dried apricots make better jam than can be made with the fruit when taken direct from the tree. We should be able to compete with Denmark in drying fruit. We have long, dry summers, and our cheap land will grow good fruit. It only needs plenty of cultivation, and we have no water rate and other heavy expenses. There should be a big future for this part in fruit drying, as we have railways and a shipping harbor close to our door."

Strathalbyn, August 27.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Cockburn (chair), T. Collett, F. S. Traeger, H. T. Moore, W. Hall, E. Hall, F. Dunford, W. Watt, J. R. Rankine (Hon. Sec.).

BREAKING LIGHT HORSES.—In a paper on this subject Mr. Collett, who had had experience in the Northern Territory with wild horses, stated that this class of horse was hard to quieten, and some were not of much use when broken in. When breaking in young horses, plenty of nerve and ability were needed. He preferred mounting in the open rather than in a yard. When breaking in to harness, a strap should be passed over the rump, and the ends of the shafts should be tied around each front leg in order to prevent too much play in the tugs of the backband.

COST OF WHEAT-GROWING.—In discussing the table set out by the Monarto South Branch, an estimate was worked out for the cost in this district. A 50-acre paddock,

valued at £7 10s. per acre, rental value 5 per cent., land to be fallowed, and an average yield of 21bush. to the acre, was taken as a basis. Rent for two years, 15s. per acre; ploughing, 5s.; cultivating, 5s.; harrowing, 2s.; drilling, 2s.; rolling, 1s.; super. 4s. 6d.; seed, 3s. 6d.; harvesting, 7s.; cornsacks, 3s. 6d.; carting, 1s. 9d.; depreciation of stock, 5s.; total, £2 15s. 3d. The return of wheat, 21bush. at 3s. 6d., £3 13s. 6d.; profit per acre, 18s. 3d. The cost of producing 1bush. of wheat was 2s. 7½d. The above prices were considered the general rates in the district, i.e., those which a farmer would charge if hired for the work. An extra profit came to the farmer, as he charged the cost of production as if paying by contract. An indirect income was the grazing before and after the crop was taken off.

Uraidla and Summertown, September 2.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. E. Hart (chair), E. Hawke, R. N. Cobbledick, H. G. Dyer, H. F. Johnson, J. Rowe, G. Prentice (Hon. Sec.).

GARDENING.—In a paper on this subject Mr. J. Rowe said that there was a tendency among gardeners to endeavor to put in too large an area without doing the work thoroughly. Good digging and careful ploughing were always necessary for root crops, and it was advisable to plough at least twice and use the harrows often in order to secure a good tilth. Wherever drains were made it should be seen that they were of sufficient depth to serve their purpose. Heavy applications of stable manure, bonedust, and chemical manures were necessary, and every attempt should be made to keep the weeds out of crops. In discussing the question, Mr. R. N. Cobbledick said that it was a bad policy to rush in crops. In a number of cases gardeners would find it more profitable to put in a smaller area of vegetables and grow more greenfeed for their stock. In reply to the remarks of members, Mr. Rowe mentioned that good results had been obtained where the practice of harrowing potatoes just when they were coming through the ground was adopted.

Woodside, August 28.

(Average annual rainfall, 31in.)

PRESENT.—Messrs. R. P. Keddie (chair), H. F. Rollbusch, C. W. Fowler, W. King, W. J. Morcom, J. Lauterbach, C. J. Sampson, A. S. Hughes, and J. Morcom (Hon. Sec.).

PASTURES.—Mr. Rollbusch read a paper in which he discussed the question of the improvement of the grass pastures. It was decided that the paper be again read at the Conference of Hills Branches to be held at Meadows on October 21st.

Woodside, September 25.

(Average annual rainfall, 31in.)

PRESENT.—Messrs. R. P. Keddie (chair), F. W. Baldock, W. King, H. Rollbusch, G. Johnston, G. J. Sampson, J. Drummond, J. Lauterbach, C. W. Fowler, A. S. Hughes, J. Morcom (Hon. Sec.), and one visitor.

POULTRY.—This subject was dealt with in the following paper by Mr. G. J. Sampson :—“Poultry-keeping is a profitable industry and a very great help to the income of the farm. There can be no question that the Leghorn is the most consistent layer in warm climates; but as it is almost useless for a table bird, it is not the best bird for the farmer. It has been laid down by some writers that the Light Brahmas and the Plymouth Rocks are the most profitable birds, being good layers and quick growers. If a pure strain is to be kept, probably the Plymouth Rock will be the most serviceable. I have found the Silver Wyandottes crossed with the Indian Game the best. They are hardy birds and splendid layers. The young roosters grow quickly, and with proper care and attention will be fit for the market at eight months old. I find that it does not do to have more than 50 fowls in one flock and sleeping in one house; in fact, 30 is quite sufficient. The houses should be warm and rainproof, with plenty of ventilation. The roosts should all be on a level and not more than 2ft. from the ground. In feeding, we have largely to be guided by the food supplies obtainable. In this district we have plenty of greenfeed for them in certain parts of the year; and in a dry season there are supplies of kale, rape, cabbage leaves, mangolds, all of which are suitable. Ground charcoal and lime should be scattered about. The grain should be wheat of the best quality. Watering must never be neglected,

and all water vessels must be kept clean and should be filled with fresh clean cold water from the spring twice daily. A flock of 40 fowls will give a yearly return as follows: Each bird will lay, on an average, 150 eggs which is equal to 500 doz., at 11d. per dozen, £22 18s. 4d. yearly; deduct the cost of feeding, £6 5s. 4d., and you have a profit of £16 13s. yearly. From this it will be necessary to write off depreciation on cost of houses and probably some loss in stock. Add to this the value of the birds you raise for the market. One hundred chickens can easily be hatched every year, and there should be no difficulty in securing 3s. each for them; 100 birds at 3s. equals £15. The cost of rearing, viz., £5 2s. being deducted, leaves a profit of £9 18s., the total return from the fowls being £26 3s. 4d."

SOUTH-EAST DISTRICT.

Mount Gambler, August 10.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Wedd (chair), Major, Botterill, Sutton, Sassanowsky, Keegan, Smith, Wheeler, Holloway, Bodey, Kennedy, Pritchard, Watson, Ruwoldt, Kilsby, Pick, Schlegel, Krummel, Cooper, D. A. Collins (Hon. Sec.), and Mr. Colebatch (Superintendent of Agriculture in South-East).

TELEGONY.—Mr. Colebatch said the subject of "telegony" was generally defined as the alleged influence of a previous sire on the offspring of the same female by another sire. The belief was still a very popular one amongst farmers and stockbreeders. It was not known when the idea arose, but it was referred to far back in history. Probably when man began to breed stock he became cognisant of variations in type. In some cases he might believe it was due to the influence of the first sire, and in other cases he might think it resulted from maternal impressions. He briefly referred to the earliest references to the theory in history, and said it was not till the year 1820 that they had the first record, with details, of what appeared to be the telegonic infection, or saturation, of a female by a male. That was a remarkable case, and there had been none recorded like it since. Lord Morton, when in India, had presented to him a young chestnut mare of seven-eighths Arab blood. When he returned to Scotland he brought the mare with him, and at the same time introduced to the country a quagga sire. The quagga was an animal related to the horse, and was remarkable for its stripes and other markings. It belonged to South Africa, and was now quite extinct. He crossed this quagga with the Arab mare. The first product of this crossing was a hybrid, bearing the markings more or less of the sire and of the dam. Then he sold the mare, and she was mated for three years with a black Arab stallion. The first foal—a filly—showed distinct stripes on various parts of the body, and was also said in the main to resemble the quagga type. In the following year a colt foal was bred, and showed markings similar to the quagga; and the third foal showed the same thing. Lord Morton stated the facts in a letter to the Royal Society, and it was not surprising that a case like this took a firm grip, and that the belief in telegony became more widespread than ever. Coming from Lord Morton, and supported by such apparently reliable evidence, it was accepted without question by the society. Even such naturalists and evolutionists as Darwin, Dr. Carpenter, Agassiz, and Herbert Spencer accepted it as true, and almost solely on the strength of Lord Morton's case; and it was not until recent times that the theory was subjected to experimental tests in a scientific manner. Professor Ewart, Professor of Natural History in the University of Edinburgh, at his stock-breeding farm, began to experiment on the lines of Lord Morton's case, and similar experiments were carried out in other parts of the world also; and so far the experimenters had not been able to get in any one instance a clear confirmation of the doctrine of telegony in any class of stock. The question then arose, "How do you get over Lord Morton's hybrids?" On investigating the matter it was found that paintings had been made by an eminent artist of Lord Morton's hybrids, which paintings were now hanging in the museum of the Royal College of Physicians, London, and when these were examined closely they did not bear out exactly the descriptions given of the animals by Lord Morton. The stripes, for example, were not nearly so marked in the foals of the

Arab horse, and in some other respects the foals resembled the Arab. It was further ascertained that the mare had been bought in India, and there was a probability that the other strain of blood in her was Indian. It was well known that among some of the Indian pony breeds there was frequent evidence of stripes appearing on certain parts of the body. In fact, in the case of some Highland ponies there were more stripes in pure-blooded animals than were shown to exist on those foals of Lord Morton's in the pictures. And even among the cases where the crossing was between extreme types (and it was held that it was more marked when the crossing was between extreme types) there had never been any cases of telegony such as that described by Lord Morton. He thought, therefore, it was too far to go back to bolster up the theory on that case when there were more likely and equally satisfactory explanations at hand without any stretch of the imagination whatever. Public beliefs were based merely on hearsay evidence. In the journals many cases that looked at first like telegony were found. For instance, it was said that the influence and characteristics of the blood horse Blair Athol were found to descend for many generations in succession; but that was what was termed prepotency. In cattle there were cases where Polled Angus cows were crossed with a Shorthorn bull and afterwards mated with bulls of their own breed, there seemed to be evidence of the Shorthorn influence in the progeny of those cows. The same thing was sometimes noticed in the case of sheep, where, for example, Highland sheep were crossed with the Leicester. The same also occurred in the case of dogs. These were worth nothing, however, as proving the theory, because it was necessary, in the first instance, to be absolutely sure of the pedigrees of the animals, otherwise a whole host of probabilities were admitted. Then, too, the beliefs were not uniform. Some believed that telegony was the influence of the very first sire a female had. Therefore it was for that that some breeders of the Bedlington terrier mated their females first with a bulldog, in order that they might afterwards get the square jaw and fighting characteristics of this description of terrier. Again, the time that this supposed influence lasted was not long. In two or three generations the female might be ready to produce pure progeny. There were some people who believed that every fresh sire left his own amount of impressiveness on the mare, so that by the time she had had half a dozen foals she would have the influence of half a dozen sires mixed up in her. Other people, again, believed that the influence could even be caught by the sire. That was said particularly among cattle breeders: that if, for example, one crossed a Shorthorn bull with Galloways or Polled Angus cattle the following sire would imbibe certain qualities of that cross, and impart them when mated again with Shorthorn cows. Others said telegony would not show itself with the first cross, but with the second; that if you crossed a mare and a donkey, and afterwards used the mare with a stallion of her own breed, it would not show in the first foal, say a filly, but that if that filly were mated with a sire of her own breed certain features of the donkey would appear in its foal. Professor Ewart, at first a strong believer in telegony, expected to obtain evidence experimentally that would establish the truth of the doctrine. In looking at his results, although at times they might appear to run counter to the experience we had had or received second-hand, we must give fair and just criticism and a fair hearing to what he had to say on the matter; for he, and he alone, had made practical trials with it. When he tackled it he first of all gathered evidence with regard to the horse and ass cross in the breeding of mules. This was a case in which he could very easily obtain evidence, especially in South America. Curiously enough, many breeders there had the idea that if they went on breeding mules from mares the latter gradually became more and more sterile; and so they made a practice of taking not more than three mules from the same mare before going on with horse-breeding from her again. Yet they had men saying they never saw an instance that would justify belief in telegony. In the west of Ireland, where they breed numerous ponies, it was said they had the same experience. It had not been found possible to repeat the mare and quagga experiment, as the quagga became extinct. The nearest approach to it was with the zebra. Professor Ewart crossed this animal with something like 30 mares of different colors, and from these mares he got 13 hybrids, and 20 subsequent foals from mares that had bred hybrids. Of the 20 foals only three showed any signs or marks whatever of the zebra. When he had experimented for some years he thought he had established a case of telegony. Markings appeared at the back of the legs and elsewhere on the foals, but these disappeared as soon as the animal dropped the foal's coat. West Highland mares, pure bred, which had never seen a zebra, had pure foals which had just the same stripes, but these persisted after the foal's coat was shed. Similar experiments were carried on on a large scale in Brazil, and negative results were obtained in every case. Herbert Spencer said telegony could not be obtained except it occurred in an extreme cross. Others again said they could not get it in the extreme cross. This was tried in the case of a mare and different stallions, and there

was not the slightest evidence, in color or otherwise, of the influence of any sire on the foals that followed by other sires. The same result followed in the case of pure-bred donkeys. It was also related that a horse called Colonel was mated with a pure-bred mare, Actaeon, and that most of Actaeon's subsequent foals bore traces of Colonel. Yet when this was carried out experimentally the case broke down entirely. In the case of dogs the belief in telegony seemed strong, but exhaustive experiments which had been carried out failed to establish the theory. He related several instances in which careful tests had been made. At the present time popular opinion was still in favor of telegony, and he was aware that some of the members of the branch might have cases in their mind that might make them think what he had been saying was contrary to the weight of evidence, but they must bear in mind that they must be absolutely positive of the purity of the strain of breed they were dealing with, and that knowledge was not so easily obtainable with the types at present existing. They must work that down to proof positive before they could be certain, and they must have control experiments.

Naracoorte, August 10.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. L. Wright (chair), W. Loller, E. Coe, A. Langeludecke, jun., C. Bray, W. E. Rogers, A. Caldwell, F. H. Holmes, J. M. Wray, and S. H. Schinckel (Hon. Sec.).

CO-OPERATIVE WOOL DEPOTS.—A lengthy discussion of this subject occurred at this meeting and also at the July meeting. [Owing to lack of space the very lengthy reports published in the South-East papers cannot be reprinted here, and it would not be fair to those who are for or against the proposal to attempt to condense the statements put forward. Possibly the Branch may be able to discuss the matter with the Wool Expert at a future meeting, when many points of misunderstanding will be cleared up and a valuable report of the proceedings be published in this *Journal*.—Ed.]



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The results of experiments in connection with methods of agriculture, etc., stock and poultry diseases, insect and fungoid pests in South Australia and other lands are recorded, as well as the results of work at Roseworthy Agricultural College.

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T. PASCOE,

MINISTER OF AGRICULTURE.

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T. PASCOE,

Minister of Agriculture

POINTS FOR PRODUCERS.

Profitable Longevity of Dairy Cows.

Probably the majority of dairy cattle are rejected from the herd on account of failure to breed, or from udder trouble, before the effect of advancing years can be observed to any marked extent. It is a fact often observed that a cow may make her best record when 10 or 11 years old, although as a rule she does her best rather earlier. If a dairy cow continues to breed she usually shows no marked decline until at least 12 years old. Occasionally a cow continues to breed until she is 16 or 18 years old. While it is not entirely safe to judge the future milk production of a cow from her two-year-old record, it is reasonably safe to judge the richness of her milk. A dairy cow on the average as a two-year-old may be expected to produce about 70 per cent. ; as a three-year-old, around 80 per cent. ; and as a four-year-old, about 90 per cent. of the milk and butter-fat she will produce under the same treatment when mature. The richness of the milk remains practically constant from year to year, except that after the third milking period there is a slow gradual decline with advancing years.

The Pollination Question.

Careful experimentation, writes the author of a bulletin issued by the Oregon Agricultural College, has shown that very little, if any, pollen of the fruit trees, other than nut trees, is transported by the wind. Probably 99 per cent. or more of the transfer of pollen is done by insects. Prime among these may be mentioned the honey bee. Bumble bees, ants, flies, moths, and short-tongued bees play an important part. However, there is no doubt but that the common hive bee is by far the best of all, and it will pay every orchardist to have a few stands among his trees.

Hen Manure with Chemical Fertilisers.

On an average, hen manure is worth about four times as much, pound for pound, as horse manure. The plan of handling it economically is to keep it very dry and pulverise it and use alone or mixed with chemicals. Sifted coal ashes, road dust, land plaster, or ground phosphate rock are all good to dry out the manure. They should be sifted freely under the perches.

Clean these perches frequently and pack the manure under cover in a dry place, sifting the drying material over it. It will be found later in dry hard chunks. These are crushed with a heavy spade or maul and the crushed manure sifted through a screen. Then it can be broadcast or scattered in the hill as it stands. A better way to get its full value is to mix it with chemicals, say, 1,000lbs. manure, 150lbs. nitrate of soda, 600lbs. fine bone, and 250lbs. muriate of potash, or small quantities in the same proportion. This gives a good fertiliser for any crop. Do not mix hen manure with wood ashes.—*Rural New Yorker*.

Treating Farmyard Manure.

When farmyard manure is ploughed in the land there is far less waste of its valuable constituents than when exposed in heaps for some time to the air and rainfall, which causes loss by fermentation and drainage of the nitrogen, ammonia, &c. The manure in the latter case will not pay for the litter that it has absorbed or the labor that it has incurred. On the other hand, when it is ploughed in soon, the manure becomes incorporated with the soil, and its effect on the latter and subsequent growth of the crop is far more advantageous. Farm manure which has been properly treated in covered yards, free from oxidation and excessive moisture, carted on to the land in this condition is almost (if not quite) as efficacious as when folded and subsequently ploughed under. The time must be passing by when heaps of dung, weighted with sodden straw (or litter of any kind), were collected from open yards and left in a heap in the corner of a field till absolutely worthless.—*Agricultural Gazette*.

English Live Stock Returns.

The preliminary statement of the agricultural returns for England and Wales, collected in June last, show decreases among all species of animals. Horses used for agricultural purposes are fewer by 30,740, but "other horses" (apart from unbroken horses) show an increase of 21,094. Separate returns under the 'atter head were first collected in 1911, and it is probable that some of the horses comprised within this category may previously have been returned as agricultural horses. Cattle have declined by 72,339, of which 44,818 were cows and heifers in milk or in calf. Sheep declined by over 1½ millions, or 6.6 per cent., the greatest relative decline being among those (other than ewes) aged one year and above. Pigs declined by 154,681, or 5.8 per cent., the decrease in the case of breeding sows being 41,514, or 11.1 per cent.

Spreading Lime with a Broom.

The question of using lime on our land, says the *Rural New Yorker*, is being agitated more and more at the present time. Farmers who have never used it before are buying in small quantities—from 2 to 5 tons. Unless one possesses a fertiliser to drill the work of putting it on becomes a problem. Of course, throwing it on by hand is out of the question, as its caustic nature would soon put one's hand out of commission, to say nothing of the discomfort it would cause to the respiratory organs. I have devised a plan for spreading it which is simple and effective. Put about 10 bags in a lumber wagon, have a man to drive the team, remove the tailboard, dump out one bag at a time in the back of the wagon; then, after having tied a large sized handkerchief over nose and mouth to keep out dust from lungs, take a common house broom and sweep out the lime a little at a time, first on the left, then on the right, and straight behind. In this way a 10ft. wide strip can be covered as fast as the team can walk. A ton an hour can be put out by this means.

Gypsum on Cow Manure.

To prevent flies from breeding in manure heaps, several of the large dairies in California use nothing but ground gypsum. One dairy uses a large quantity. They have over 100 head of stock continually housed, and claim that there is absolutely no odor, nor will flies go near it. All that is necessary to do is to sprinkle a small portion of this dust at the back of the stalls and on the manure pit.

Independence which is a Handicap.

There is such a thing as making a farce of this so-called "independence" of the farmer, says *Hoard's Dairyman*. Only a few years ago every farmer in Wisconsin was very independently making his own butter—or his wife was—and swapping it at the store for codfish, calico, and what not, and he thought he was doing very well if he got 15 cents a pound in trade for it. Every batch of butter had its own independent flavor. All this has been changed. Farmers dropped their lofty notions of making independent butter and came together in co-operation, and took their milk to a creamery, where good butter saleable for cash was made. See how the consumption and price of butter have increased under co-operation. Just as the farmer ceased to be foolishly independent did he become more prosperous, for his milk gave forth better butter. This is what co-operation has done with butter. There is such a thing as having a poverty-stricken independence.

Farming College on Wheels.

More than 102,000 California farmers attended the lectures of the University of California professors and visited the Southern Pacific agricultural demonstration train during the 1911-12 season, just ended. The precise number of auditors at these lectures was 102,624, according to a careful census taken at each stop of the train. This is an increase of 24,400, or 31 per cent., over the attendance of last year. Close to 5,000 miles were covered by the train during the 1911-12 season—more than twice the distance covered in 1908. There was a noted increase in attendance at practically every place visited. In only a few instances did the attendance show decrease, and in all cases it was caused by inclement weather. This was the fourth year of the agricultural and horticultural demonstration trains, and greater attention was given to actual instruction work. The cars were arranged so that persons interested in any one of the subjects exhibited could visit that car in particular, listen to the lecture of the specialist in charge of the car, and ask as many questions about the subject as they saw fit. Discussion was invited, and through such disputation many important and interesting facts were made clear to all producers.—*Pacific Rural Press*.

Apples in the United States.

The Bureau of the Census reports that on April 15th, 1910, there were 151,323,000 apple trees of bearing age, and 65,792,000 trees of non-bearing age in the United States. The production of apples in 1909 was 147,522,000 bushels, valued at \$83,231,000. According to the census of 1900 there were 201,794,000 trees reported June 1st, 1900, and the production of apples in 1899 was 175,397,000 bush. Only about 10 per cent. of the apples produced in this country are exported. They represent the very highest qualities in fresh fruit—about \$5,300,000 worth on an average for the past two years, and 45,000,000 lbs. of dried apple exports last year, worth \$3,850,000.—*Californian Fruitgrower*.

Efficacy of Fertilisers on Soils Relatively Rich.

Can fertilisers be profitably employed on soils which, by chemical analysis, are shown to contain a total sufficient supply of plant foods? Theoretically it would be thought that if the soil is naturally so rich, the application of more plant foods would be an unnecessary expenditure, but in practice the result works out differently; and this apparent paradox arises from the fact that much of the plant food, shown by analysis as present in the soil, is not in an available condition. This applies especially to applications of phosphate of lime and potash.

Foot and Mouth Disease.

Thirteen separate centres of foot and mouth disease have come to light in the United Kingdom since the outbreak in Cumberland on June 24th last, and the total number of outbreaks confirmed up to September 9th was 75, distributed as follows :—Chester, 7 outbreaks ; Cumberland, 3 ; Durham, 1 ; Flint, 1 ; Hampshire, 1 ; Lancashire, 8 ; Leicester, 3 ; Northumberland, 28 ; Salop, 1 ; Somerset, 2 ; Staffs, 1 ; Surrey, 1 ; Sussex (East), 4 ; Yorkshire (East Riding), 2 ; Yorkshire (West Riding), 12.

Powder for Plant Food.

The United States Army and Navy Departments, says the *Pacific Rural Press*, find themselves with millions of pounds of obsolescent powder on hand which cost half a dollar a pound—too expensive, they conclude, to be dumped into the sea, as has been the custom with cheaper grades in the past. They have, therefore, called on the Department of Agriculture to help them out, and Dr. B. T. Galloway, Chief of the Bureau of Plant Industry, has made some exhaustive experiments with the powder as a fertiliser, which promises to relieve the fighting department of their accumulation of obsolete explosives, composed largely of nitrogen, as are all high explosives. Some way has yet to be found to treat the powder to make it profitable financially as a fertiliser, but the experiments thus far have proved its value for that purpose, and the proper way of treating it to make possible its distribution, it is expected, will shortly be found.

Imports and Exports of Plants.

During the month of October 8,168bush. of fresh fruits, 5,220 bags of potatoes, 1,366 bags of onions, 59pkgs. of plants, and 20pkgs. of vegetables were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885 ; 632bush. of bananas (chiefly over-ripe) and 1pkg. of plants were rejected. Under the Federal Commerce Act 544 cases of fresh fruit, 4,215pkgs. of dried fruit, 29pkgs. of preserved fruit, 2pkgs. of honey, and 911pkgs. of plants and seeds were exported to oversea markets during the same period. These were distributed as follows :—For London, 2,282pkgs. of dried fruit, 910pkgs. seeds, and 2pkgs. honey ; for South Africa, 130pkgs. dried fruit ; for Canada, 741pkgs. dried fruit ; for India and East, 120 cases apples, 29pkgs. preserved fruit, and 7pkgs. dried fruit ; for New Zealand, 424 cases citrus fruit, 1,055pkgs. dried fruit, and 1pkg. of plants. Under the Federal Quarantine Act 1,395pkgs. of plants, seeds, bulbs, &c., were examined and introduced from oversea markets.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

"W. R. S." asks which takes most out of the soil in a wheat paddock, cutting the crop for hay or taking it off with the stripper as a grain crop?

Reply—In a warm, dry climate the wheat plant ceases to take nutriment from the ground soon after flowering. So far as depletion of essential minerals is concerned it is, therefore, immaterial whether the crop be removed after that stage as hay or as grain and straw. If the straw is left standing after stripping, to be ultimately incorporated with the soil, about 20 per cent. of the nitrogen and 30 per cent. of the phosphoric acid (about 50lbs. supers. to the acre) will be restored, in addition to the organic matter of the straw, which will form humus. If the straw is burned off, the 20 per cent. of nitrogen will be lost, and, of course, the organic matter.

TREATMENT OF ORANGE TREES.

"S. R. C.," East Adelaide, asks for advice in regard to his orange trees, which some 10 weeks ago blossomed very freely, but when the blossom fell off the leaves from the top branches also fell off, and the branches commenced to die.

Reply—Mr. G. Quinn, Horticultural Instructor, writes—"From the description of the orange trees I imagine there is something affecting their roots, as the symptoms of leaf-shedding and dying of the tips of the shoots indicate this. If the subsoil happens to be a stiff clay, the terminal roots have most likely decayed during the past winter, and the evidence was only manifested when the strain of blossoming came. I would suggest—to strike balance between the absorbing roots and the transpiring surface above ground—the tops be cut back some little distance below the declining shoots. Keep the soil loose around the tree over the spread of roots and water sparingly until growth begins, after which the water may be increased. Apply the water in rings made just about as wide as the spread of the foliage, putting

about 4ozs. to 8ozs. sulphate of ammonia in the ring before watering. When the watered soil loses its stickiness, break up the trenches and pulverise the soil to an even surface. If you have any stable manure, put it an inch thick over the soil, covering just a little wider than the watered area with the mulch. Do not water on top of the mulch, but push it away each time and replace it again."

"M. B.," Sandy Creek, asks what is the right quantity of potash to apply to orange trees.

Reply—Mr. Quinn writes—"Potash is considered a most important factor in determining the quality of the fruit of the orange. Sulphate is the best form in which to apply it to trees of a bearing age. Use from $\frac{1}{2}$ lb. to $1\frac{1}{2}$ lbs. per tree, according to size. It is usually dug in around the trees, extending a little beyond the spread of the foliage in early winter. As the season is now advanced, I would suggest, if you irrigate, putting it in the rings and washing it into the soil as soon as convenient. If not utilised by the trees directly it will not be lost, as it does not leach out of the land. If your orangery is on sandy soil it is almost certain to be deficient in potash. Sulphate of potash usually costs about 14s. to 15s. per hundredweight in Adelaide, and contains about 52 per cent. of actual potash."

FEED FOR CHICKENS.

"C. C. C." asks if it is advisable to give raw meat to chickens, and for a remedy for scaly leg.

Reply—It is inadvisable to give raw meat to chickens. You may dig up damp ground and give them earthworms. Toe picking is occasionally seen among chickens, and sometimes a weak one may be pecked and eaten. You must watch them, and any which are being pecked must be removed until the sore has healed.

Scaly leg.—Scrub the legs with a stiff brush and hot soapy water. Dry well and then smear liberally with soft soap. A second application in a fortnight may be necessary.

WHEN TO SOW LUCERNE AND SORGHUM.

"A. M. P." asks the best time to sow lucerne and sorghum seed in the district of Hookina.

Reply.—Sow lucerne in the autumn, during March, April, or May, as soon as you get a good rain to put the land in condition. In the northern areas, where the land sets very hard under the hot weather, as lucerne is a delicate plant at the start, it is generally found that sowing in the autumn in a good season before the weather gets cold, on land that has been cleaned by good fallowing, succeeds better than spring sowing. In the south spring sowing is to be preferred. Sorghum should be sown at the end of September and during the first half of October.

STOCK INQUIRIES.

(Replies supplied by Mr. F. E. PLACE, M.R.C.V.S., B.V.Sc., Veterinary Lecturer.)

"G. H. P.," Karoonda Bore, Brown's Well, has a young horse, rising 5, which suffers from a soft swelling between his front legs; the swelling disappears on exercise or being at grass. Other horses have had similar swellings in various parts of the body, such as breast and sheath, which disappear in a few days on being turned out. Another horse coughs and is very distressed at work, heaves at flanks, &c. He asks for advice.

Reply—The trouble here is lymphadenitis, a disease similar to strangles. The inquirer points out the treatment, namely, rest and green feed. As a preventive half an ounce of flowers of sulphur may be given once daily for a fortnight in a little chaff or bran. One or two ounces of hyposulphite of soda in drinking water once or twice daily for a few days is useful when the disease is on. In the case of the horse that is distressed, the disease has spread to the lungs. Work should be avoided altogether in such cases, as most dangerous inflammation of the lungs often follows it.

"A. J. H.," Mount Gambier, has a four-year-old mare which was bred in a swampy place and lived there till 3 years, when she was broken in. She often goes very lame after work, but recovers after rest. Sometimes the lameness will work off and recur on the same journey. She is worse in winter. He asks the cause of the trouble.

Reply—It is quite impossible to give an opinion of value on the symptoms described, but from the history it is probable that the mare suffers from injuries to the blood vessels caused by worms. She may become worse at any time, and it is not advisable to depend upon her growing out of her trouble. Treatment which might improve her would be half an ounce of Fowler's solution of arsenic in her food twice daily for a fortnight, and then once every other day for 10 times more.



HERD OF WHITE CATTLE.

LEAF SCORCH DISEASE OF CELERY.

By T. G. B. OSBORN, M.Sc., Professor of Botany and Vegetable Pathologist,
Adelaide University.

The celery "leaf scorch" (also known as "leaf spot," and in the United States as "late blight") is a disease that has only comparatively recently come into notice, either in the United States of America or in Europe. In the last two years it has become widespread in the United Kingdom, and a full account of the disease was published last year in England*. In July last the South Australian Department of Agriculture received celery leaves affected with leaf scorch from Mount Gambier. The grower stated that his crop had been



Fig. 1.—Celery Leaf infected with *Septoria Petroselinii*, Desm. var. *Apii* Br. and Cav.
Pycnidia of the fungus are visible on the leaflets and on the stem. Natural size.

ruined for the last two or three years by the disease. It has therefore been thought advisable to publish a short account of leaf scorch for the information of other growers.

Celery leaf scorch is caused by a fungus known as *Septoria Petroselinii*, Desm. var. *apii*, Br. & Cav. The typical form of this fungus (*S. Petroselinii*)

* Chittenden, F. J. "Leaf Spot of Celery." Journ. Roy. Hort. Soc. (London),
vol. 37, p. 115. 1911.

occurs on parsley, but it has not yet been recorded for the State. Other members of this genus attack the leaves of pears, carnations, raspberries or blackberries, and wheat, and have been found on the last four plants within this State.

APPEARANCE OF THE DISEASE.

In the case of celery plants, small scattered yellowish patches, rapidly becoming brown, appear on the leaf. These are irregular in shape, and if conditions are favorable to the growth of the fungus the whole leaf may be affected. The withered brown appearance it then presents has given rise to the popular name of "leaf scorch." Such a destruction of the leaves checks the growth of the head, and may result in a general wilting of the plant. Soon after the spots on the leaf turn brown the fructifications of the fungus become visible as numerous minute black spots dotted over the brown area (fig. 1.) The warm, damp days of the late autumn in England are most favorable to the growth of the fungus, and it may spread along

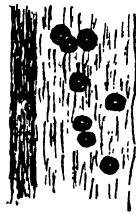


Fig. 2. - Magnified view of portion of infected celery leaf stalk, showing pycnidia. $\times 10$.

whole rows of celery with great rapidity. In the United States the chief harm is done to celery plants in the early autumn, though a few spots of the disease may be present at any time during the summer. In that country, where it is usual to lift the crop early and store the heads, much of the damage occurs in the store, especially if the ventilation is defective.

DESCRIPTION OF THE FUNGUS.

If a diseased portion of the leaf or stalk be examined with a magnifying glass the fructification is seen to have the appearance shown in fig. 2. Each of the black dots or fruit bodies (*pycnidia*) is composed of a dark-brown mass of fungus cells (*hyphae*) closely interwoven to form a flask-shaped receptacle (fig. 3), and imbedded in the tissue of the plant. The neck of the flask is open and projects above the surface of the plant. All round the inside walls of the flask are the fungus cells on which the reproductive spores are formed. The spores are long but very narrow, being almost needle-shaped, only they are often slightly curved. A high power of the microscope shows them to be composed of five or six cells (fig. 4). The spores are produced in countless

numbers inside each flask-shaped pycnidium, and escape through the open mouth to the surface of the leaf in the form of a thread. There, in drops of water or by air currents, these are borne to fresh leaves which they infect.

METHODS OF DISTRIBUTION.

Rapid dissemination of the disease occurs by means of the spores described above. The fungus exists in a dried up condition from season to season on

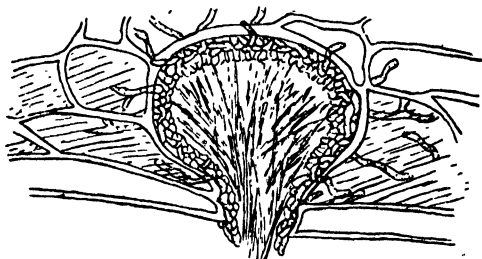


Fig. 3.—Section of celery leaf passing through a pycnidium, showing the flask-shaped fruit body embedded in the leaf tissue and containing numerous spores. Highly magnified.

any dead leaves or stalks that may be left about the celery beds. It retains its vitality for some time under these conditions. The spores germinate when there is sufficient moisture and infect the next crop of young celery plants. The presence about the celery beds of dead leaves or stalks from the previous year's crop may account for a recurrence of the disease; but crops grown in fresh ground could seldom be infected in this manner. It has been shown by Mr. Chittenden that the seed sown is frequently infected, and may be the cause of a fresh outbreak. His observations have been confirmed by an



Fig. 4.—Spores of the celery leaf scorch fungus. Very highly magnified.



Fig. 5.—Celery "seed" and fruit-stalk showing pycnidia of the leaf scorch fungus. By sowing such seed a fresh infection of the new crop is almost sure to result. Magnified 10.

examination of seed in this State. Celery "seed" is really the small fruit of the celery plant, the true seed being enclosed within it. The fungus attacks the fruit walls and the small stalks upon which the fruits are borne, as it does all other green parts of the plant, and produces its fructifications upon them. A few celery seeds taken from a sample sent from Mount Gambier and obtained by the grower from a reputable seedsman, will illustrate this

(fig. 5). In the figure the larger black spots seen upon the three seeds and stalk represent pycnidia of the fungus. These are common upon the fruit stalks, but not so common on the fruit itself. Thus the sowing of fresh seed may even cause a recurrence of the disease upon the next season's crop.

TREATMENT.

The field treatment that has been recommended is to spray with dilute Bordeaux mixture, or with a solution of potassium sulphide, 1oz. to 3galls. of water.

In the store special attention should be paid to ventilation and dryness.

The refuse from an infected crop should be gathered up and burnt, and not merely thrown on the rubbish heap.

If possible seed should be purchased which is clean and shows no sign of the fungus. Samples that show many pieces of fruit stalks or small withered seeds should be avoided.

FARM ANIMALS.

HEREDITARY UNSOUNDNESS (*Continued*).

By C. A. LOXTON, G.M.V.C., Assistant G.V.S.

BONE SPAVIN.

This disease is the most frequent and most serious of those affecting the hock, and occurs as a deposit of bone on the inner and lower portion of the joint. The hock joint is a very complex one, consisting of an upper portion, which, with the bone of the leg (*tibia*), helps to form the true hock joint, and is where the principal movement of the hock takes place; the lower portion of the hock is made up of four small bones, having gliding surfaces between them, and rests on the top of the cannon bone. It is the inner aspect of the bones forming the lower portion of the hock which is implicated in bone spavin, the bony deposit taking place both between the bones and on the internal surface of the joint forming the enlargement known as a spavin. This deposit of bone obliterates the gliding surfaces between the small bones already spoken of and causes stiffness and want of proper freedom of flexion of the hock.

Spavin is seen most frequently in light horses, more especially those with weak badly-formed hocks. Any defect in the conformation of the joint acts as a predisposing cause, all forms of defective hock being liable to the disease. The complicated mechanism of the joint is in itself a predisposing factor, and this tendency is greatly increased if any weakness is present owing to defective conformation.

Apart altogether from predisposition due to defective conformation, heredity plays a strong part, for it is well known that certain families with well-formed hocks have a tendency to become affected with spavin. The occurrence of the disease in young animals which have done no work also points to hereditary predisposition. As a rule one hock only is affected, but occasionally the disease is seen in both. The visible enlargement varies in size and position, and the extent of the lameness is not in proportion to the size of the bony deposit; in fact, characteristic spavin lameness is sometimes seen without any visible alteration in the joint—occult spavin. However, spavins in a forward position usually cause a more severe lameness, and in some cases render the subject a permanent cripple.

SYMPTOMS.

When a spavin is of any size it can be seen by standing in front of the horse and viewing the hocks from between the forelegs and comparing the internal contour of the joints. The sense of touch is also of considerable value in detecting spavin, but both skill and practice are necessary. When at rest the animal stands with the affected leg forward, the heel raised and the hock flexed. When made to "stand over," weakness is shown by the quick jerking movement of the affected leg; this is also seen by turning him sharply in his own length. Lameness is increased by turning the horse in a short circle, turning towards the sound side.

Spavin lameness is most pronounced when the horse is first taken out of the stable and wears off with work, but appears again after a rest. The action is marked by stiffness of the affected leg and want of freedom in hock flexion. Sometimes pain is shown by forcible flexion of the joint, but the leg should be grasped by the cannon, as any disease of the lower joints might lead to a wrong opinion should the leg be raised by holding up the foot.

The disease develops slowly, and sometimes lameness is present before any change can be detected in the joint. Once the process of the disease is complete, and the affected bones are firmly cemented together, the acute symptoms of lameness may disappear, but there will always be a noticeable want of hock flexion shown by the wear of the shoe at the toe.

Local heat and pain at the seat of the disease may or may not be present.

In breeding special attention should be paid to this form of hereditary unsoundness. Avoid breeding from stock affected with the disease, and from those with any defective conformation of the hock.

A DESTRUCTIVE ROOT MITE.

The failure of some French beans to germinate at Mount Barker led to investigations being made as to the nature of some small mites which were found in large numbers upon the beans. They were submitted to Mr. A. M. Lee, the Entomologist at the Adelaide Museum, who at once recognised them as the "bulb mite" (*Rhizoglyphus echinopus*), a name meaning "spiny-legged root eater."

The mite is very small, and a good magnifying glass is needed to see it at all clearly. It is almost transparent, but slightly brown at the head. Mr. Lee says that the pest occurs in many parts of the world and attacks a multitude of plants. Stored onions and bulbs are frequently attacked and seriously injured. When attacked they appear to be covered with a kind of greasy dust, this being due to the bodies of the mites and their droppings. When the mite appears it is generally in enormous numbers. Some seedlings are attacked as soon as they commence to grow, with the consequence that they just break through the ground and die; or they may not even break the ground before dying. The mite is sometimes the real cause of the apparent failure of seeds to germinate. Carrots are sometimes attacked just where the leaves join the carrot itself, and in consequence the leaves fall off and the carrot commences to rot and hollow out. Cuttings when put into the ground will often not root on account of this pest, and an examination will show that the bark has rotted and is swarming with mites. The mites seem to prefer to attack plants which have been injured in some way, or which are growing under unhealthy conditions. With fruit trees the pest usually appears only after the roots have been injured by cultivation, or weakened by the attacks of fungi or insects. When once it appears, however, the plant attacked is nearly always doomed.

When the roots of the apple are attacked the bark of the root softens and readily tears off, and on examination is seen to be swarming with the mites in places; and small roots do not grow on the attacked parts. The trunk a few inches above ground is also sometimes attacked, the mites seeming to work upwards from the rotting roots. Sulphur will prevent the mites attacking stored bulbs and cuttings, but once they have gained access to the roots nothing economically practicable can be done against them.

THE VALUE OF BIRDS TO MAN.

PROTECTION AND PRESERVATION URGED.

In a paper entitled "The Value of Birds to Man" which was read at a meeting of the British Empire Naturalists' Association, Mr. James Buckland puts forward a strong plea for the protection and preservation of bird life. The author deals with his subject in a comprehensive manner. His paper is too long to permit of reproduction in the *Journal*, but the following extracts should afford food for reflection :—

"Vegetation is the prime requisite for the perpetuity of all other forms of life upon the earth. It is the only form in organic nature that does not war upon other forms. The greatest known enemy to vegetation is insect life, while bird life, by virtue of its predominating insect diet, wields a most important balance of power against the ravages of this chief pest of vegetation.

"This is the principal mission of the bird in preserving the balance of nature's forces; and when we remember that birds are distinguished from all other animals by organs of perfect flight, when we remember that the sense of sight in birds is developed to a degree unparalleled in the animal world, when we remember the surpassing breathing power possessed by birds, their wonderful muscular strength and activity, the high temperature and rapid circulation of their blood, and, as necessary fuel for all these fires, their extraordinary capacity for assimilating food, we must admit that these marvellous creatures are admirably fitted to pursue and capture their natural prey, or, by making earth-wide sweeps from zone to zone, to follow the seasonal ebb and flow of the tide of insect life.

NUMBER AND REPRODUCTIVENESS OF INSECTS.

"The number of insect species is greater by far than that of the species of all other living creatures combined. Over 300,000 have been described, and it is considered not improbable that twice that number remain to be described. Practically all living animals, as well as most plants, furnish food for these innumerable hordes.

"The fecundity of certain insect forms is astounding, the numbers bred reaching such prodigious proportions as to be almost beyond belief. Riley once computed that the hop aphid, developing 13 generations in a single year,

would, if unchecked to the end of the twelfth generation, have multiplied to the inconceivable number of ten sextillions of individuals. Noting the preceding, Forbush says if this brood were marshalled into line, 10 to the inch, it would extend to a point so sunk in the profundity of space that light from the head of the procession travelling at the rate of 184,000 miles per second would require 2,500 years in which to reach the earth.

"Kirkland has computed that one pair of gipsy moths, if unchecked, would produce enough progeny in eight years to destroy all the foliage in the United States. A Canadian entomologist has determined that a single pair of Colorado beetles, without check, would multiply in one season to 60,000,000 units.

"The voracity of insect life is as astonishing as its power of reproduction. Many caterpillars consume twice their weight in leaves per day, which corresponds to a horse eating daily a ton of hay.

"The development of young birds is so rapid and the demand upon the vitality of the older ones so great that an enormous amount of food is necessary to sustain the vital processes. The number of insects daily passed into the insatiable maws of the nestlings almost exceeds belief. But the most valuable services of the adult bird are rendered when it is feeding in winter or early spring, for then it destroys countless numbers of insects in the embryo state, and thus prevents myriads of depredators from coming forth.

"Grave and far-reaching results invariably follow the suppression of this perennial regulative influence which is exerted by birds individually everywhere as a check on insect life."

CHECKING INSECT IRRUPTIONS.

Instances in support of this statement are then given, and the paper proceeds:—"In the early days of the colonisation of New Zealand swarms of caterpillars infested the open tussock-clad country. When the white man began to cultivate the land this caterpillar disappeared from its old haunts and attacked the English grasses and cereal crops, increasing so enormously in numbers by reason of a more favorable environment that they quickly became a blasting plague. They came not singly, or even in battalions, but in mighty armies which laid waste the land. I have seen regiments of this invading force cover the pastures in such numbers as to make the green one brown. I have seen them march out of one cornfield—having stripped every stalk bare—cross the road in solid phalanx and pass into another. I have seen big mobs of sheep mustered in hot haste and driven backwards and forwards to crush the atoms with their hurrying feet. I have seen every available horse-roller in a district brought up hurriedly, like engines to a fire, and dragged to and fro over the crawling masses until the huge cylinders stuck fast in the mire of crushed insects. I have seen large ditches dug to

stop the invaders' progress. The efforts were as futile as that of a child who builds a bank of sand by the sea, thinking it will stem the oncoming tide. Even railway trains were brought to a standstill, the wheels of the engine being unable to grip the rails owing to the countless hordes of caterpillars which were crossing the line. In time it became clear that if this disastrous condition continued it would be useless to attempt to carry on agriculture in New Zealand. Realising that any attempt which they might make to rid the smitten land of the plague would be but a mockery, the farmers turned their eyes longingly to the natural enemy of the caterpillar—the bird.

“Therefore insectivorous birds from the old country were introduced, and the one that multiplied most rapidly was the sparrow. And the sparrow soon cut short the career of the caterpillars.

“That formidable imported weed, the variegated Scotch thistle threatened to overrun the whole of New Zealand. Where it had once fairly established itself it seemed impossible to eradicate it; and it was spreading with the speed of scandal. . . . But the sparrows took to eating the seed. In tens of thousands they fed on it, giving it a preference to all other hard food, and the weed was conquered.

“To-day, in New Zealand, the sparrow is looked upon as an impudent thief, without a redeeming feature in its character. No one, of course, can say what would happen if the sparrow was dismissed from New Zealand, but it is certain that the Dominion would be again overrun with caterpillars and thistles.

“In Australia a plague of grasshoppers periodically visits the paddocks to devour the crops. But the ruin they would otherwise bring on the farmer is checked by large flocks of glossy ibises, spoonbills, cranes, and other native birds. It has been computed by an eminent naturalist that a flock of 200,000 of these saviours will consume in a single day 25 tons of grasshoppers.”

THE VALUE OF THE BIRD IN THE ORCHARD.

On this phase of his subject Mr. Buckland states:—“For man's purposes the work of the bird in the orchard is not so thorough as that done by them in the forest. Birds are the slaves of nature, and in the main nature's endeavors are put forth only to produce such fruits as will ensure the perpetuity of each species of tree. With man the case is altogether different. His main object is not the propagation of trees, but the production of a giant gooseberry. Moreover, by introducing arsenical spraying, tarred and greased bands, and other devices to counteract the evil action of insects, he has to a certain extent taken upon himself the office of the bird. In this he is wise, for it must be admitted that if he wishes a large crop of fruit he must himself prevent the inroads of those insects which attack the fruit directly. It cannot be expected of the bird that it will become an efficient ally of man in

protecting the artificially produced fruit from the attacks of the numerous insects that are drawn to the orchard by a vastly increased quantity of fruit of a vastly better quality than the natural product. For all that, fruitgrowers are largely indebted to the bird for a great part of their annual crop. There are a host of tiny creatures that are not affected by spraying. These lili-pitian pests are the plant lice and their allies, bark lice, and scale insects. Usually their presence is unnoticed on account of their diminutive size; but they suck out the juices of the tree and are exceedingly harmful. If their multiplication remained unchecked the ultimate result upon the development of the fruit, if not upon the life of the tree, would be very great. But nothing, however small, escapes the prying eyes of a bird, and it clears the trunk branches and twigs of these encumbrances.

"Birds are charged, as though the case were one of theft, with feeding to a greater or less extent on the fruit which they help to produce. In Nature such services as the bird renders in direct protection of the tree is placed to its credit, and it receives its reward. Does man expect it, for his sake, to deviate from those habits which it has contracted under natural conditions? In other words, does he expect the bird to assist him in producing an unnatural surplus of fruit?

"Call the bird in the orchard an evil, if you will. But it is a necessary evil and the fruitgrower must make up his mind to pay the bird its wages, even though at times they may seem exorbitant.

"But let us suppose for a moment—though the supposition is absurd—that the modern fruitgrower could do without the services of the bird. Would that give him a right to slay it? Apart altogether from the agriculturist, what of the millions of people who, as an increment to their ordinary livelihood, grow fruit, but who cannot afford either the time or the money to treat their trees in the most approved and scientific way? What would happen to this poorer class of fruitgrowers if they were deprived of the services of the bird is best seen in what happened to Frederick the Great. This worthy, in a fit of passion, because a flock of sparrows had pecked at some of his cherries, ordered every small bird that could be searched out to be instantly killed. Within two years his cherry trees, though bare of fruit, were weighed down with a splendid crop of insects."

Among other questions dealt with by the author are: "The Value of Birds in Forests," "The Services of the Bird in the Garden," "Utility of Birds in the Meadow," "Value of Birds to Livestock," "The Bird as a Weed-destroyer," "The Bird as a Scavenger." The copy of the paper from which the extracts are taken was supplied by Mr. J. F. Mellor, of Fulham.

NAVEL ORANGES.

SALE IN ENGLAND.

The following special report, dated London, September 20th, has been received from the Trade Commissioner :—

Some few years ago I wrote at some length in regard to the prospect for the sale of Navel oranges in England. I then stated that, providing the quality was right and given proper supervision this end, it would be possible to realise as high as 20s. per case for a limited supply. Since writing the report referred to I have had the additional experience of personally selling thousands of cases of citrus and other fruits, not only to London buyers, but throughout the United Kingdom, and I am more than ever convinced that what I then affirmed can be put into actual effect. I stated a "limited quantity," because there are a certain number of shops in London and other large cities in the United Kingdom that have a class of customer who will buy fruit if it is attractive, and particularly if it is out of the ordinary season, no matter what the cost is ; but necessarily this class of buyer is limited. I have discussed the question of importing oranges with many large wholesale and retail buyers in the provinces, as well as London, and the consensus of opinion is that for any quantity up to, say, -1,000 cases of evenly-graded and well-packed medium-sized Navel oranges, if properly distributed, there would be sufficient demand to warrant asking from 15s. to 20s. per case ; but if we intend shipping larger quantities, say, 10,000 or 20,000 cases during the season, then we should of necessity have to take in the middle-class shops, and their purchasing power would be limited at from 12s. to 14s. ,

My reason for again bringing the prospects of the market for this class of fruit before your notice is that I understand a further large area of land suitable for orange-growing is to be opened up on the river ; and it occurred to me that if a gross price of 12s. per case in England would pay, settlers could not do better than plant Navel oranges. I know that this price could have been obtained this season, and future conditions are not likely to be worse ; on the contrary, in the course of a few years, prices should be even better.

Apart from the improved purchasing power of the general public in England, there is to be considered that it is even more so in other countries. Take Germany as an instance. In 1880 the total population was 45,000,000, while in 1910 it was nearly 65,000,000, and is growing at the rate of about

900,000 per annum. I mention Germany in particular because it is one of the largest markets in the world for oranges, and statistics show that the consumption is annually increasing; and I think it is logical that as the German demand increases it will mean a less supply for England. I am aware that it has been stated by some of the growers in South Australia that a gross return of 12s. London is not a payable proposition to the grower, say, at Renmark. After all, I suppose the growers themselves should be better able to judge of what will pay them than I can be; but I may be allowed to suggest that probably when they have arrived at this conclusion they have been guided more by the price similar fruit has obtained on the local market than what would actually pay if grown in large quantities. Assuming that the freight to be 60s. per ton, 12s. gross London would mean not less than 8s. net Port Adelaide. In stating 12s. per case as my opinion of the lowest price we should obtain, I do so with every confidence, but subject to the following being strictly carried out:—

1. The growers should co-operate, in order that the number of marks should be reduced to a minimum, and the grading absolutely uniform.
2. The fruit should be shipped through one channel, to ensure proper distribution this end, as it would be fatal to the best interests of the growers if the whole of one shipment were placed on the London market only.
3. Shipments should be divided up as equally as possible, commencing in July, and the last shipment should reach London not later than the first week in October.
4. The most saleable sizes for a large quantity would be 72/80 per case.

Shipments arriving during the month specified would be certain to find ready sale, as the English markets are, with the exception of Cape oranges, quite bare of this class of fruit, the Continental fruit not commencing to come forward until the end of October. The principal sources of supply are Spain, Italy, and Turkey, with a comparatively small quantity from the United States. The total quantity of oranges imported into the United Kingdom last year was 259,000 tons, four-fifths of the whole being from Spain.

Last year 15,000 cases of oranges were imported from Cape Colony. The first shipment from that country usually arrives in London about the end of June, and the shipments continue until about the middle of September. During the past season ordinary Cape oranges have realised as high as from 15s. to 20s. per case.

Since writing the above I have had a chat with a representative of the Trade Commissioner of South Africa, and he gave me the following information, that may be of interest to you:—The standard cases of oranges from South Africa measure 12in. x 12in. x 26in. with centre partition. The oranges

from Cape ports are carried as ordinary cargo at 25s. per ton, while the oranges from the Natal ports are carried in cool chambers at 50s. per ton. Under the new mail contract, a copy of which I enclose, there is a reduction of 10s. per ton, providing the fruit is graded and passed by the Government inspectors, thus making the freight 40s. per ton for all Government inspected fruit. The last shipment of the season—800 cases of oranges—was put on the market last week, and realised the following prices :—Ninety-six to case, 17s. ; 126 to case, 18s. ; 150 to case, 18s. ; 176 to case, 19s. ; 252 to case, 20s. The average price for the season is, as near as possible, 12s.

NEW LIGHT ON LIME.

By J. B. MORMAN in *Country Gentleman*.

Every farmer knows from experience that sometimes the land needs an application of lime for its improvement, but for a long time neither science nor practice could give a satisfactory reason for this fact. Recently the beneficial action of lime has been recognised to be the result of physical, chemical, physiological, and bacteriological forces working in harmony.

The physical effects of liming were found to be dependent upon the character of the soil. An application of lime on heavy clay soils causes a flocculation of the fine particles and thereby materially improves the tilth, increases aeration, and facilitates the circulation of water. On light, sandy soils lime causes a reduction in porosity and thereby increases their water-holding capacity, limits oxidation processes, and favors bacterial activity.

The chemical effects of liming are mainly those dealing with the action of potash and phosphoric acid as essential plant foods. The action of lime in liberating potash from insoluble compounds is so pronounced that it has led many experts to regard lime as an indirect potash fertiliser. In like manner lime applied to soils that contain phosphorus in iron and aluminum compounds reacts with these substances in forming calcium phosphate—one of the most available forms of phosphoric fertilisers. Liming in such a case is

therefore regarded as an indirect application of phosphoric acid. Another chemical effect of lime is its neutralisation of acid substances which accumulate in soil; as a direct result of the growth of crops and the decay of humus. If lime or other bases were not occasionally supplied to the land these acid substances would accumulate in such large quantities as to decrease production and render cultivation unprofitable.

BACTERIAL GROWTH INCREASED.

The chemical and physiological effects of liming are closely related. Acid conditions in soils not only diminish the supply of available plant food, but have a direct physiological effect on the plants themselves. Naturally this effect varies with the plant as well as with the form of the acid substance and the existing soil conditions. In neutralising such acid substances lime has a direct physiological effect on the plants. Furthermore, the relation of calcium to magnesium in the soils is of vital importance to the physiological functions in plants, so that by altering the calcium-magnesium normal ratio in soils through the application of lime plants may be benefited or injured to a greater or less extent.

The more recent development of the science of bacteriology has revealed the fact that there are many unsolved problems relating to the effects of lime on the growth and activities of soil bacteria. For the purpose of solving these problems the Iowa Experiment Station undertook a series of elaborate experiments on the bacteriological effects of liming. The branches studied related to the effects of lime on the increase or decrease of soil bacteria, on ammonification, nitrification, formation of nitrates, nitrogen fixation and denitrification in soils. The methods employed were virtually the same in each series of experiments, there being check samples and soils treated with lime at the rates of half a ton and one, two, and three tons an acre respectively. These amounts of lime were maintained in all the experiments reported. The conclusions reached as to the effects of lime on these different aspects of the problems may be summarised as follows:—Applications of lime in varying quantities increased the number of bacteria by a minimum of 75,000 to a maximum of 2,710,000 per gram of air-dry soil. The results of bacterial increase being considered as a whole, it was found that applications of ground limestone increased the bacteria in the soil rather uniformly. The larger the amount applied—up to three tons an acre—the greater the number of bacteria. On the other hand, a natural increase in the bacteria has a tendency to obscure the effects of liming, whereas a natural decrease makes them more pronounced. The actual number of organisms present in the same soil at different dates, when kept under greenhouse conditions, is exceedingly variable.

The experiments relating to ammonification, nitrification, formation of nitrates, and nitrogen fixation in soils had for their object the determination of the effects of the application of varying quantities of lime in rendering available to plants the nitrogen in soils to which nitrogenous fertilisers had also been applied. In these tests the results, when taken as a whole, were exceedingly uniform. It was found that whatever method was employed to test the ammonifying power in soils, applications of lime led to the gradual production of increasing amounts of ammonia, which is, of course, a readily available source of nitrogen. Likewise, the general conclusion in the nitrification tests was that applications of lime cause increasing nitrate production according to the amount of lime used, the gains being almost proportional to the amount of lime, up to three tons an acre. With reference to the accumulation of nitrates in soils, it was found that applications of lime led to their slight increase; and in tests of nitrogen fixation the application of three tons of lime in all cases seemed the most profitable from the standpoint of actual nitrogen fixed in the soils.

The denitrification experiments showed that there was a complete transformation of the nitrate nitrogen into protein, and that no loss had occurred as a result of testing the denitrifying power of the soil in solutions and in beakers. Similarly in the soils themselves, there was no loss of nitrates, just as much being present at the end as at the beginning of the experiment. "The reason for this lack of denitrification might be the absence of denitrifying bacteria, or it might be that the conditions of the experiment were not optimum."

To test the accuracy of the laboratory experiments a field test was made with oats as a crop, and the conclusions from this experiment are as follows:—Applications of lime up to three tons an acre increased the crop yield; half-ton and ton applications of lime caused a very small increase; the nitrogen content in the crops is increased much more rapidly than the yield itself; and the crops from the soils that receive small amounts of lime contain more nitrogen than those from the check soils, though the weights are virtually the same.

The practical lessons to be learned from these elaborate researches on liming are that the application of lime to soils in quantities ranging from half a ton to three tons an acre will render more available the plant foods in soils and fertilisers, thereby improving crop conditions; that an application of lime is practically equivalent to the direct use of the essential fertilisers of nitrogen, phosphoric acid, and potash, since lime forms soluble compounds of these plant foods and thereby increases crop yields; and that, when experience teaches the farmer that his soils need liming, he can confidently make use of lime up to three tons an acre without danger of injuring his land or lowering the yields of crops.

POULTRY NOTES.

BY D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR NOVEMBER.

THE GROWING STOCK.

It is presumed that all breeders have had a successful hatching season, and are now attending to the last hatchings. The later hatched chickens will need every attention if they are to mature and become fine, well-developed specimens. They must be allowed as much succulent green food as they will eat, and particular attention must be paid to the drinking water.

Shade must be provided, as the sun is at times very hot, and in a few weeks we may experience our usual heat waves. Frames, on which brushwood is placed, or on which calico, canvas, split wheat bags, &c., are stretched, will serve the purpose admirably. Many suburban breeders neglect to provide any shelter for their birds other than ramshackle structures which must be as hot as ovens. On hot days, where water is available, the ground under these shelters should be soaked with water. The birds will appreciate the cool, damp soil, and young stock will scratch therein and thrive accordingly.

Grading.—Separate the growing chicks and ducklings into various sizes. Do not keep large and small together, as the latter suffer. This is a very important, though generally overlooked, point.

Culling.—All weakly, deformed, and otherwise inferior specimens should be destroyed, as no good purpose is served by attempting to rear them. Weakly specimens, if they reach maturity, will breed weakly progeny.

Breeders of show stock may discard all badly mismarked stock and those which show palpable defects. It will take the average breeder all his time to do justice to his best chickens, &c.; why waste time and food on stock that will be of little, if any, value?

Separate the Sexes at an early age: This applies especially to Leghorns, Andalusians, Minorcas, and other light breeds. The little cockerels are often precocious, and, in addition to worrying the pullets, will fight among themselves, and thus much harm results. House the cockerels as far from the hens and pullets as you can; they will be more contented and will fight less. When reviewing a flock of pullets or a flock of cockerels it is easy to cull out the inferior birds and wasters. It is also a good plan to select the best and most forward and pen them apart. The cockerels should be carefully culled, as only a certain proportion, of even the best, will be ultimately retained.

PULLETS FOR LAYING COMPETITIONS.

Each year, when the time arrives for entering pens, or later on for forwarding them, it is reported that certain breeders are unable to do so because of some of the following reasons:—1. They have not enough pullets. 2. The pullets are too old and have been laying for some time. 3. The pullets are too young and will not lay for a month. 4. Neighbors' cats or dogs have committed serious depredations and the chicken yards are empty.

The Laying Competitions serve many purposes admirably. They allow breeders the opportunity of a rigid public test. They afford the public an opportunity of contrasting the merits of the strains of various breeders. They demonstrate the value of strain, of good housing, of scientific feeding, and of careful attention. They stimulate young breeders and invite the uninitiated to enter the ranks of breeders. They assist in the distribution of large quantities of eggs and large numbers of chickens and stock of high utility value among the producing community. They form one of the finest advertisements that the State can have. There are breeders in millions throughout the world, and the thousands of poultry journals have more or less to say about the South Australian competitions. Does the reader wish to compete, and thus add his help to the good work? If so, is he or she one of those who have the foregoing excuses to make? If so, the answer will be --

1. You must breed successive batches of pullets, and should have at least 20 from which to select your final pen. You will meet some of the best laying strains in Australia and perhaps the world, so any six pullets picked up haphazard will not have much chance of winning. Before it is too late you may perhaps buy some chickens. Of course, in the latter case the credit of breeding really belongs to the man whose stock bred the eggs or the chickens.

2. It is, of course, a poor policy to let your pullets lay 20 or 30 eggs each before you send them to the competition. Moreover, pullets when laying should not be sent on a journey.

3. If too young the chances are that they have, when at length they begin laying, lost too much time and have too much leeway to recover.

4. Secure yarding and housing will generally prevent the depredations of dogs and cats. At times it is necessary, however, to adopt more certain measures. A stitch in time saves nine.

Do not Force your Competition Pullets.—This is a common error and results in many complications. Feed well and keep the birds growing. Change them from run to run as often as you can. Change does them good, promotes growth and retards the precocious instinct to begin laying at an early date. The longer the period of maturity the better the frame will develop; also the organs of reproduction. Small eggs are generally laid by these precocious pullets. Give great variety of food, and if obtainable use a good proportion of oats. Use neither meat nor green bone. Give plenty of cut green food, and let it be fresh and sappy. Green food contains the valuable mineral

elements which are lacking in grain foods and seeds. The pullets may have exercise, which is best afforded by supplying plenty of short straw, in which the grain is scattered. Competitors are requested to carefully read the regulations. This is not always done.

POINTERS.

Look out for vermin, and take prompt steps to eradicate any discovered. Vermin-infested stock cannot be expected to thrive.

Use kerosine in the poultry houses, and flood cracks and crevices and apply liberally to the perches.

Nest boxes as usually seen are harbors of vermin. Make the nests on the ground and screen them with a piece of sheet iron. Use insect powder in the nests. Do not apply kerosine nor any strongly smelling substance.

Scrub out the drinking vessels and scald them at frequent and regular intervals. During warm weather just tinge the drinking water with a solution of permanganate of potash (sometimes called Condyl's crystals).

If short of green food, sow in prepared beds some rape or maize and water liberally. Sprouted grain is an excellent food used in strict moderation. When the sprouts are allowed to grow the green growth is excellent green feed.

Now the breeding season is over, all male birds should be shut up in yards by themselves. The breeding stock will then soon produce infertile eggs which are of good market quality.

Wash the shells of all eggs sent to market. Pack carefully, and use patent egg boxes provided with cardboard fillers. There are some in stock at the Produce Department, price 2s. 6d. complete; capacity, 25 doz. They will last a long time.

If your birds are not doing well write at once for information or advice. Do not wait until the birds are dead.

NOTES ON EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

The appended reports of the Superintendents will prove interesting to competitors. We are now approaching the time when the seasonal forecasts will be indulged in. Although the leading pen at Roseworthy has about 100 eggs to the good, as compared with the leading pen (1911-12) on the same date, it remains to be seen whether the present leader will maintain much of the advantage gained. Last year the leading pen, which made the world's record, put in some surprisingly good work until the termination of the test. During the last month the winning pen made its best score; we may not witness a repetition. Given properly-bred birds, last year's test at Kybybolite has put to flight the unfounded opinions so often expressed, viz., that the locality is not suited to poultry. It appears as if this year's work will do more to show that such opinion was worthless. In cold wet districts the main consideration is adequate housing. Of course properly bred and scientifically-fed stock are a *sine qua non*.

ROSEWORTHY.

The Superintendent reports—The laying for the month has shown a steady all-round increase, and averages are being well sustained. The general appearance and health of the birds is good. The following deaths have occurred:—One in section 1, one in section 2, and one in section 3. The first was due through cannibalism, the second bird was a waster, and the third showed no outward signs for cause of death. The owners were informed of their losses, and two of them replaced their birds immediately; but the other competitor is carrying out his former policy of ignoring the incident, which is to his disadvantage only. Section 1 has supplied 20 broodies; section 2 has been content with 101; while section 3 has failed to produce any. The weather for the month has been of a mild nature; wind has prevailed on 26 days and has been of a moderate character, with two or three exceptions. The average maximum temperature was 71.5°, the average minimum 38.7°, with 86.2° and 27.3° as the highest and lowest readings. Rain fell on five days, registering a total of 94 points. Reviewing the birds, it is gratifying to note the tight-feathered appearance of the majority, which indicates a continuance for some time of the steady output of eggs. While nothing brilliant has been achieved by way of weekly individual scoring, a satisfactory fair all-round average has been maintained, thus indicating a grading-up process right through the course of breeding. This is more desirable in a competition than two or three brilliant pens and the rest nowhere. Comparing the averages for the present test with those of last year we find a general increase in the production of light breeds, with a small easing off with the heavy breeds for the same period of competition. For 1911-12 the average per pen for light breeds was 552.6; for the heavy section 523.6; while for this year the pen average for section 1 is 613.3; and for section 2 499.7; while for section 3, or scratching house test, 592.3. This latter test is an innovation at Roseworthy, and is being tried with a view to testing the productiveness of hens enclosed in a shed with the floor covered with litter against birds of the same strain allowed the open yard and house during the cold and wet period of the year. So far this test has shown the averages in favor of the open yard birds; but these results may not have been obtained entirely owing to the house conditions so much as to the fact that birds reared under free range conditions would naturally resent being shut up for a period of six months. These birds now have open yard conditions, and it will be interesting to note their efforts to make up the leeway during the remaining five months. The most noticeable feature about these birds is the development of comb compared with the birds which have had free range all the time. The pen average in this test with 134 pens competing is 583.9, against that of 546.8 for 126 pens last year.

Inter-State Competitors.—In the present test 29 pens are competing in section 1 in the interests of the other States, and to show that these birds are holding their own, I can quote a pen average of 619.1; section 2 contains 10 pens with an average of 485.3; and section 3 has two pens with an average of 525. In addition to the favorable figures put up by these birds, inter-State competitors will be pleased to learn that their birds are all enjoying good health and look well and compare more than favorably in size with the majority of South Australian entries. Although the latter are noted layers, one is faced with the fact that many of the birds are very small, and pens have been selected with an unevenness which is very noticeable. This may have been caused through circumstances over which competitors had no control, but it is nevertheless a difficulty which it would be well to overcome.

KYBYBOLITE.

During the month five birds in section 1 died, death in all cases being due to oviduct troubles. Two died in section 2; these were suffering from paralysis. Otherwise the birds have all been in a good healthy condition. The laying started to fall away a little towards the end of September and the beginning of October, consequently I let the birds out for the first time, and they are now given the run of the yards during the day time. The yards are all planted with kale, which is about 3ft. high, and in the hot weather will shade the birds and also provide a good supply of green feed. The leading pen, F. Lacey's, has eased up slightly, but the birds are all looking well, and I expect a good deal more from them before the year is out, as they are about 100 in advance of the leading pen for the same period last year. The second pen, owned by Moritz Bros., are looking well, and as the strain has been proved as layers before, there ought to be a good score put up by them and a fight for the leadership. Pen 22, "Herdsfield," are looking well and are putting up some good weekly scores, and possibly will be somewhere up at the finish. In section 2, Herdsfield are leading with a fairly good score, considering that they were practically two months doing nothing. In section 1 two birds had to be removed for broodiness, and eight in section 2. The weather has been all that could be desired during the latter part of the month, though earlier it was dull and windy. The mercury reached a maximum shade temperature of 80° and a minimum temperature of 33°.

D. F. LAURIE, Poultry Expert.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended Oct. 31st.	Total Eggs Laid from April 1st, 1912, to Oct. 31st, 1912.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Cowan Bros., Burwood, N.S.W.	137	825
Tabuteau, J. O., Black Rock, Melbourne	120	653
Hodges, H., Pyalong, Victoria	145	677
The Range Poultry Farm, Toowoomba, Queensland	136	715
Brundett, S., Moonee Ponds, Victoria	143	723
Jessup, W. C., Caulfield, Victoria	132	658
Dawes, J. H., Granville, Sydney	140	787
Beadnall Bros., Gawler	129	801
Redfern Poultry Farm, Caulfield, Victoria	147	692
Kerr, R., Longwood, S.A.	151	805
Eckermann, W. P., Eudunda	137	724
McNab, J. A., Sandringham, Victoria	112	638
Mazey, P., Alberton	116	542
Broderick, P. J., Gawler	110	593
Redfern Poultry Farm, Caulfield, Victoria	136	609
Braund, J. E. and H. J., Islington	132	578
Dunn, L. F., Keswick	128	629
Hocking, E. D., Kadina	141	618
Groom, E., Peterhead	118	590
Pope, R. W., Heidelberg, Victoria	138	772
Haines, T. F., Fullarton Estate	130	556
Provis, W., Eudunda	135	634
Burton, W. S., Moonta Mines	129	621
Broster, G., Mallala	152	649
Brain, J. H., South Yan Yean, Victoria	132	653
Sargenfri Poultry Yards, East Payneham	129	784
McKenzie, H., Northcote, Victoria	147	738
McDonnell, J., Greytown, Rosewater	119	719
Browne, A. R., Hawke's Bay, N.Z.	138	751
Brain, J. H., South Yan Yean, Victoria	134	572
Marsden, C., Welland	120	488
Hutton, C., Parkside	130	622
Miels, C. & H., Littlehampton	110	559
Moritz Bros., Kalangadoo	129	695
Codling, H., Mitcham Park	132	524
Troughbridge Poultry Yards, Edithburg, Y.P.	110	588
Irvine, A. W., Epsom, Auckland, N.Z.	108	609
Walker, P., Hicksborough, Victoria	122	606
Lampe, B., Kadina	108	431
Waite, F. J. O., Nailsworth	129	727

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Oct. 31st.	Total Eggs Laid from April 1st, 1912, to Oct. 31st, 1912.
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SECTION I.—LIGHT BREEDS—*Continued.*WHITE LEGHORNS—*Continued.*

Badcock, G., Mile End	138	552
McClelland, A., Mordialloc, Victoria	111	500
Tomlinson, W., Clarence Park	132	620
Roberts, L. L., Kadina	143	615
"Strathcona," Long Plain	133	633
Whitegate Poultry Farm, Deepdene, Victoria	112	610
Purvis, Miss Gracie, Glanville	137	664
Padman, A. H., Hyde Park	135	696
Sickert, P., Clarence Park	137	677
Purvis, W., Glanville	122	671
Rice, J. E., Cottonville	135	764
Hamill, H., Kogarah Bay, Sydney	139	589
Gurr, W. E., Kapunda	87	602
McLeish, E., North Adelaide	130	600
Craig Bros., Hackney	84	632
Uren, Mrs. P. A., Kapunda	153	922
Perry, Wm., Murrumbena, Victoria	122	555
Nancarrow, J. T., Port Adelaide	84	510
Bertelsmeier, C. B., Clare	132	680
Tockington Park Poultry Farm, Grange	121	706
Trenwith, T. H., Kadina	136	526
Knappstein & Bray, Clare	129	520
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	128	607
"Denehollow," Caulfield, Victoria	127	578
Hill, Chas., Monarto South	97	419
"Islay," East Malvern, Victoria	133	564
Cosh, A. J., Burnside	126	686
Indra Poultry Farm, Freeling	131	586
Whitrow, A. J., Knoxville	125	649
Hall, T. C., Rose Park	111	666
Ontario Poultry Farm, Clarendon	130	620
Howlett, H., Moonta	115	589
"Koonoowarra," Enfield	102	702
Hall, A. W., South Oakleigh, Victoria	143	729
Convent of the Good Shepherd, Oakleigh, Victoria	117	532
Carne, E. A., Kangaroo Flat, Victoria	135	642
Navan Poultry Farm, Minlaton	109	503
Lillywhite, R. G., Fullarton	110	661
Gibbs & Pine, Queenstown	86	397
Hughes, J. J., Elsternwick, Victoria	133	514
Shamrock Poultry Farm, Perth, W.A.	126	548
Bertelsmeier, C. B., Clare	139	600
Nancarrow, J. T., Port Adelaide	144	636

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Robertson, F. H., Northam, W.A.	99	451
McKenzie, E., Northcote, Victoria	87	427
Mitchell, B., Bendigo, Victoria	102	437
Provia, W., Eudunda	117	506
Kenway, D., West Pennant Hills, Sydney	110	614
Cowan Bros., Burwood, N.S.W.	115	616
Kenmore Poultry Farm, Dandenong, Victoria	87	396
Brundett, S., Moonee Ponds, Victoria	111	520
Cant, E. V., Richmond	119	551

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Oct. 31st.	Total Eggs Laid from April 1st, 1912, to Oct. 31st, 1912.
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SECTION II.—HEAVY BREEDS—*Continued.*BLACK ORPINGTONS—*Continued.*

Craig, Mrs. C., Hackney	115	504
Lampe, B., Kadina	108	488
Wirraparinga Poultry Yards, Plympton	95	453
Phillips, A., Portland, S.A.	128	454
Martin, B. P., Unley Park	113	533
Nancarrow, J. T., Port Adelaide	86	303
Padman, J. E., Plympton	107	581
Francis Bros., Fullarton	114	439
Hall, T. C., Rose Park	126	587
Tockington Park Poultry Farm, Grange	103	464
Bertelsmeier C. B., Clare	97	525
Craig Bros., Hackney	117	601
Bertelsmeier, C. B., Clare	115	486

SILVER WYANDOTTES.

Dunn, L. F., Keswick	118	627
Tidswell, H. J., Mitcham Park	73	546
Moyse, S., Blyth	98	416
Perry, Wm., Murrumbena, Victoria	96	456
"Denehollow," Caulfield, Victoria	95	518
Western, F. C., Marion	88	624

SALMON FAVEROLLES.

Courtenay, K., Mordialloc, Victoria	105	567
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LANGSHANS.

Stevens, E. F., Littlehampton	127	594
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PLYMOUTH ROCKS.

"Koonoowarra," Enfield	138	477
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SECTION III.—SCRATCHING SHED SECTION.

WHITE LEGHORNS.

Sickert, P., Clarence Park	148	710
Tomlinson, W., Clarence Park	144	782
Moritz Bros., Kalangadoo	150	588
Codling, H., Mitcham Park	92	554
Sargenfri Poultry Yards, East Payneham	106	580
Purvis, W., Glanville	111	595
Bertelsmeier, C. B., Clare	149	678
Padman, A. H., Hyde Park	139	739
Hocking, E. D., Kadina	136	583
Beadnall Bros., Gawler	116	553
Brain, J. H., South Yan Yean, Victoria	112	416
Provis, W., Eudunda	140	644
Redfern Poultry Farm, Caulfield, Victoria	141	680
Broderick, P. J., Gawler	145	565
"Koonoowarra," Enfield	132	531
Lillywhite, R. G., Fullarton	141	596
Cosh, A. J., Burnside	121	553
Indra Poultry Farm, Freeling	134	589
Whitrow, A. J., Knoxville	131	594
Tockington Park Poultry Farm, Grange	129	645

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended Oct. 31st, 1912.	Total Eggs Laid from April 1st, 1912, to Oct. 31st, 1912.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	146	789
Dow, A., Glencoe West	78	724
McNamara, Mrs., Mount Gambier	126	625
Moritz Bros., Kalangadoo	137	883
"Mahama," Mount Gambier	124	694
Holmes, F. A., Frances	138	746
Sudholz, A., Kalangadoo	119	602
Staunton, S., Naracoorte	110	531
Hall, C. W., Mount Gambier	133	711
Moritz Bros., Kalangadoo	138	791
Vorwerk, K. E., Millicent	129	713
Vorwerk, H. F. & A. C., Millicent	132	715
Jarrad, J., Mount Gambier	137	677
Bartram, T. A., Kybybolite	135	789
Vorwerk, H. F. & A. C., Millicent	90	563
Jenkins, R. D., Kybybolite	114	548
Arthur, J. S., Bordertown	99	633
Drake, C., Naracoorte	140	656
"Eurinima," Kybybolite	124	739
Smith, M., Hynam	140	605
Lacey, F. C., Kybybolite	121	893
"Herdfield," Mount Gambier	143	819
Blue Lake Poultry Farm, Mount Gambier	132	619
Beaton, W. J., Tantanoola	136	674
Bennett, E., Kalangadoo	131	539
Jones, H. F., Mount Gambier	126	575

MINORCAS.

James, S. T., Mount Gambier	134	413
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdfield," Mount Gambier	152	637
Blue Lake Poultry Farm, Mount Gambier	78	445
McNamara, Mrs., Mount Gambier	80	299

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	85	517
Osborne, W. F., Kalangadoo	114	590

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	118	351
Glenelg River Poultry Farm, Mount Gambier	127	392

D. F. LAURIE, Poultry Expert.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, October 2nd, there being present Messrs. A. M. Dawkins (Chairman), G. R. Laffer, C. J. Valentine, C. E. Birks, G. F. Cleland, J. Miller, Col. Rowell, Professors Lowrie and Perkins, and G. G. Nicholls (Secretary).

ARTESIAN WATER.

A letter was received from the Engineer-in-Chief in answer to an inquiry which had been forwarded to him by the board, as follows:—"So far as South Australia is concerned there has been no apparent decrease in the flow of artesian bores, but this has, I understand, taken place both in New South Wales and Queensland, and may arise from a depletion of the water supply. At the recent Conference on artesian waters held in Sydney it was considered advisable that action should be taken to regulate the bores tapping the artesian supply with a view to its conservation. This matter, I believe, is still under consideration by the representatives of the various States at the Conference."

RESOLUTIONS FROM CONGRESS.

Compulsory Registration of Stallions.—This matter was held over till a future meeting to allow members time to fully consider the discussion and resolution from Congress.

Selling Fat Cattle by Live Weight.—It was decided to ascertain the views of the Pastoralists' Association respecting this proposal, as representing the largest suppliers of fat cattle, before taking further action.

Import Duty on Superphosphate.—With reference to the resolution protesting against the imposition of a duty on super., the Secretary mentioned that at the Conference of Ministers of Agriculture in Sydney some time ago it was decided that the matter should be dealt with at the forthcoming Premiers' Conference. The Board therefore decided to send the resolution, with which it agreed, on to the Minister.

Wheat over Weighbridge.—The desire of the Congress that the board should endeavor to secure the introduction of a system of weighing wheat by the load over weighbridges was tabled. The Chairman was satisfied that it would save time and a few pounds to the grower on the turn of the scales. The Secretary mentioned that in New South Wales the wheat-growers were keen to have weighbridges for the purpose of weighing their produce. The railway authorities in that State, however, declined to consider any request for a weighbridge unless the quantity of wheat dispatched

from that particular place totalled 10,000 or more bags annually. He had learned that in South Australia in 1910 there were 100 stations from which 10,000 or more bags were sent away. Professor Lowrie could not understand why the present method of weighing each bag singly was tolerated, although there had been justification for carefully weighing and sampling every bag. Ultimately Professor Lowrie seconded a motion by Mr. Cleland to consult the corn trade authorities of the Chamber of Commerce, which was duly carried.

HORSE STUD BOOK.

The Gawler River Branch wished to know whether any action had been taken in respect to the formation of a horse stud book. The Secretary indicated that the Farmers' Congress had discussed the matter last year, and a recommendation had been forwarded to the Minister asking that a report should be secured from Professor Lowrie. The Director informed the Board that he had not furnished a report for more reasons than one. He had been anxious to discover the extent of the interest in horse-breeding, and how his scheme for the improvement of stock would be received by those particularly concerned. Had that or something similar been adopted the need for a stud book could have been urged with greater force. Personally, he considered that the demand for a stud book should come from the breeders, and that they should be the controlling power. The book should be kept by the Royal Agricultural Society. He was prepared to report in favor of the breeders forming themselves into an organisation and approaching the society with the object indicated; but he would not recommend that the work should be undertaken by the Agricultural Department. Col. Rowell believed that the question had been brought under the notice of the Agricultural Society, but the expense involved had proved a stumbling block. He thought it would be a good plan for the Professor to meet the Council of the society and put the position before it. If the matter was left in his hands he would make the necessary arrangements. Professor Lowrie said he would gladly do so if it was the wish of the society. He considered that the adoption of a stud book would do more towards improving the stamp of horses than the compulsory registration of stallions.

DATES OF FRUIT AND VEGETABLE MARKET.

Mr. Miller drew attention to the fact that many gardeners were opposed to the Monday fruit and vegetable market, because of the Sunday work involved in getting produce ready. Col. Rowell and Mr. Laffer pointed out that the large demand for supplies for Broken Hill made it necessary to hold the market on the days now ruling. Mr. Laffer added that the growers could not afford to have any restrictions placed on the marketing of the

produce. There was much unnecessary Sunday work done, however, such as digging potatoes—a job that could very well be done during the week. He thought that those growers who observed the Sabbath did not lose much by so doing.

A NEW BRANCH.

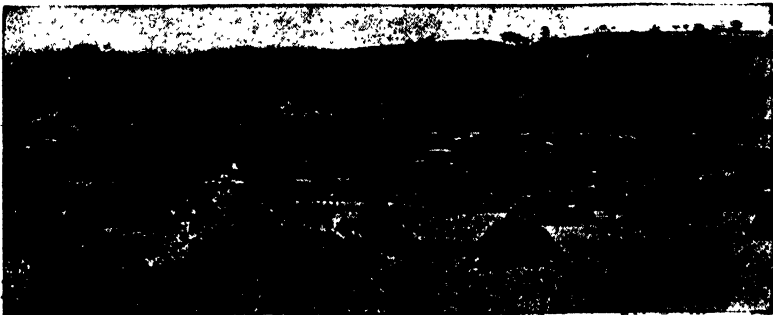
The formation of a Branch of the Bureau at South Loxton was approved with the following gentlemen as members:—Messrs. A. Lowe, H. Lowe, C. Durdin, A. Durdin, C. Swinbourne, C. Webber, S. Lowe, J. Lowe, R. Beer, H. W. Russell, A. W. Russell, R. J. Russell, K. Kendall, W. B. Russell.

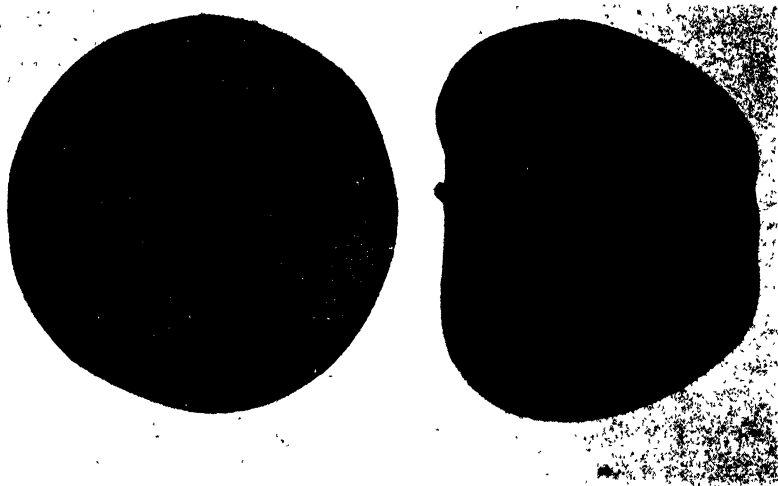
NEW MEMBERS.

The following gentlemen were approved as members of the Branches shown:—Elbow Hill—J. F. Brooks; Sutherlands—A. M. Twartz, J. Badge; Coomooroo—C. Phillis, C. Phillis, F. Gregory, L. Avery, A. Brice; Hartley—W. Cross, H. Cross, A. Wundersitz; Wepowie—G. Goss; Coorabie—R. R. Muegge, E. Oats, D. McLeod; Kingscote—B. H. Bell; Green Patch—H. Hill, C. Dorward, H. Schwerdt, T. Murray, A. Murray, D. Murray, S. Bailey; Coorabie—J. Jackson; Clarendon—H. A. Giles; Minlaton—J. Nankivell; Meningie—S. Yates, F. R. Deane; Crystal Brook—A. Story; Kanmantoo—T. B. Mills; Spalding—G. Page, D. Pryde, C. T. Cadzow, M. J. McCarthy, C. H. Wilson; Bute—L. Simon; Clare—J. J. Slaterry, J. Burgess; Pinnaroo—H. J. Harfield; Green Patch—C. Venning; Friedrichswalde—T. Prior, R. Marlow, G. Grope, L. Johnson, J. Michalaney; Ironbank—N. H. Coates; Blyth—F. C. Williams, T. Williams, W. Reinke, jun., J. T. Harman, A. V. Heyemann, E. C. Deland; Georgetown—A. Smallacombe, J. Bond, B. G. Dowd; Wilkawatt—D. Horgan; Narrung—C. B. Powell; Hartley—C. Hutson; Coomooroo—A. Pitchers; Morphet Vale—F. W. Crittenden; Koppio—G. Miller, sen.; Wirrabara—E. Pitman; Coonalpyn—J. Turner, jun.

LIFE MEMBER.

Mr. J. Schuppan, of the Wilmington Branch, was made a life member of the Bureau at the previous meeting, but through an oversight his name was omitted from the last report.





APPLE—DUNN'S SEEDLING.

FRUIT.

Size—Medium to large, ranging from $3\frac{1}{2}$ in. to 3 in. on young trees to $2\frac{1}{2}$ in. by $2\frac{1}{4}$ in. as a fair sample from mature plants. *Shape*—Conical and regular, widest in transverse section. *Color of skin*—Pale greenish-yellow when growing, turning to bright golden-yellow when ripe, suffused with brownish-red on the exposed side, indistinct dots scattered all over, showing slightly paler in the yellow, and darker on the reddened surfaces. *Eye*—Open, with short slightly erect and twisted segments set in a regular, smooth, shallow cavity. *Stamens*—Marginal, tube long, narrow, funnel-shaped. *Stalk*—Stout, $\frac{1}{2}$ in. to $\frac{3}{4}$ in. long, clubbed at end, inserted in a fairly even basin, the sides of which are lined with russet in dry districts, but in wet localities the cracking of this russeted skin induces rough cork-like formations, which often split and spoil the apple. *Flesh*—Clear, creamy-white color, of very firm texture. Flavor, moderately sweet, and first-rate when cooked. *Seed cells*—Obovate, axile, with large central cavity; season, from March until September.

TREE.

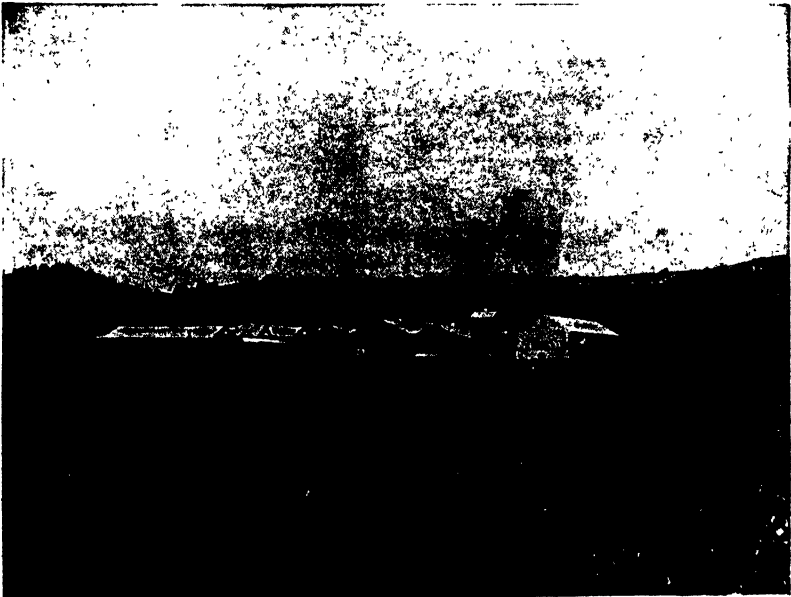
Habit—Erect, stiff, and vigorous, forming closely-set short spurs and stout laterals along the limbs, giving them a knotted appearance. The bark varies from a dull grey to reddish-brown color, sprinkled with a few scattered white dots between the nodes. The habit lends itself to the erect cordon-like formation being given its main leading limbs, which, after the first few seasons, may be permitted to run untopped, more particularly when grown in strong soils. It is not a consistent bearer, but sets a fair to good crop on



DUNN'S SEEDLING APPLE.

A. Vaughan, Gent. Photograph.

alternate seasons. *Climatic conditions*—The climatic conditions found most suitable are those of the dry and warm portions of this State north of Adelaide, where the annual rainfall is 20in. to 24in., and no rain of consequence falls after the fruits are one-quarter grown. In wetter localities the cracking of the fruit condemns it. It blooms with Jonathan and Cleopatra in early October, and is ready for shipment towards the end of March. *Origin*—The apple figured herein was raised by Mr. William Dunn, of Gordon Bank, near Houghton, in this State, about 60 years ago, and is said to be a seedling from Stone Pippin, which it resembles in some respects. An apple which is claimed to be identical with this one is grown in Victoria as Munroe's Favorite, and in New Zealand under the name of Ohinemuri. It is not badly affected by diseases, and is almost immune from the bitter pit defect.



VINEYARD AND WINE-CELLARS

THE WHEAT MARKET.

Contrary to general expectations, the war in the Balkans had very little effect on the London wheat market, and prices locally during the month showed but slight variation. Writing in regard to the situation on October 4th, before the outbreak of hostilities, *Beerbohm's* says:—"Even if war break out, which is still doubtful, it would not necessarily interfere materially with the supplies of grain, unless some of the big powers be drawn into the struggle later on. Freights in the Danube and Black Sea have advanced decidedly for prompt boats, owing to many Greek steamers being detained on the other side of Constantinople by Turkey. Imports into the United Kingdom were very large last week, being about 200,000 quarters above the estimated consumptive requirements. The estimated stocks at the principal U.K. ports on October 1st amounted to about 2,000,000 quarters, or only 50,000 quarters larger than on August 1st. As the imports in August and September, notwithstanding small deliveries of English wheat, have been 500,000 quarters above the consumptive requirements, it follows that stocks in second hands have increased by over 400,000 quarters, as there is no reason to believe that the consumption, compared with recent years, has materially increased. Shipments were again on a very liberal scale, and since the commencement of the season have amounted to 10,830,000 quarters, against 9,090,000 quarters last season. Whilst North America is expected to continue shipping largely for some time to come, especially now that the Canadian proportion will be steadily increasing, exports from Russia and the Danube may not be so large later on, as anticipated, as there has been no general buying for distant positions. There have been a fair number of steamers chartered from Kurrachee recently, and the exports from India promise to continue liberal for the time of year."

The following tabular statement, taken from the same authority, gives the world's visible wheat supply on October 1st, as compared with that on the same date in previous years:—

THE WORLD'S VISIBLE WHEAT SUPPLY ON OCTOBER 1st.				
	European. Qrs.	U.S./Canada. Qrs.	Total. Qrs.	Eng. Aver'ge Price.
1912	8,180,000	6,330,000	14,510,000	31/7
1911	9,140,000	8,835,000	17,975,000	32/6
1910	11,360,000	7,715,000	19,075,000	30/1
1909	6,730,000	4,880,000	11,610,000	32/9
1908	6,985,000	6,750,000	13,735,000	31/6
1907	7,660,000	7,750,000	15,410,000	31/8
1906	8,690,000	7,500,000	16,190,000	25/9
1905	8,200,000	4,050,000	12,255,000	26/9
1904	9,045,000	4,175,000	13,215,000	29/10
1903	7,975,000	4,530,000	12,505,000	27/-
1902	6,890,000	6,120,000	13,010,000	26/6
1901	8,475,000	7,500,000	15,975,000	25/10
1900	8,280,000	10,800,000	19,080,000	28/9
1899	7,675,000	8,600,000	16,275,000	25/6
1898	4,800,000	3,440,000	8,240,000	25/9
1897	5,865,000	4,720,000	10,585,000	33/11
1896	6,130,000	8,700,000	14,830,000	25/2

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Oct. 7	—	4/1	4/3	4/4
8	Firm, but quiet; Liverpool steadily held, not active	4/1	Do.	Do.
9	Do.	Do.	Do.	Do.
10	Firm, held higher, Jan.-Feb., 4/9½; Liverpool held for advance	Do.	Do.	Do.
11	Firm firm, 3d. to 6d. advance asked, Sept.-Oct., 5/0½	Do.	Do.	Do.
12	Firm but quiet	Do.	Do.	Do.
14	—	Do.	4/3½	4/4½
15	Very firm, 6d. to 1s. advance asked; Jan.-Feb., 4/11½; Liverpool, firm, held for 1/- advance	4/2	4/4	4/5
16	Dull with easier tendency; Liverpool quiet	Do.	4/3½	4/4½
17	Dull; offered lower	4/1	Do.	Do.
18	Do.	Do.	Do.	Do.
19	Quiet; Liverpool very dull, and lower to sell	Do.	Do.	Do.
21	—	Do.	Do.	Do.
22	Steady, but quiet	Do.	Do.	Do.
23	Firm, but quiet; Liverpool, steady but quiet	Do.	4/4	4/5
24	Very firm; Liverpool firm, held for 3d. advance	Do.	Do.	Do.
25	Steady, but quiet; Feb.-March, 4/10½	Do.	Do.	Do.
26	Dull; Liverpool, steady	Do.	4/4 to 4/4½	4/5 to 4/5½
28	—	Do.	4/5½	4/5½
29	Dull, easier tendency; Liverpool steady but quiet	Do.	Do.	Do.
30	Very dull; Liverpool dull, easier tendency	Do.	4/4½ to 4/5	Do.
31	Dull; Liverpool neglected, lower to sell	Do.	Do.	Do.
Nov. 1	Very dull, lower to sell	Do.	4/4½	4/5 to 4/5½
2	—	Do.	Do.	Do.
4	—	Do.	4/3 to 4/4	Do.
5	Dull and neglected; Liverpool dull and neglected	Do.	Do.	4/4 to 4/4½

STEAMER FREIGHTS.—(October 3rd).—Steamers from South Australia to United Kingdom-Continent, full cargo rates, new crop, 40s. per ton (1s. 1d. per bush.). Parcels, Port Adelaide to London, Liverpool, or Continent, 17s. 6d. per ton (5½d. per bush.); Port Adelaide to Melbourne, 8s. per ton (2½d. per bush.); to Sydney, 10s. 6d. per ton (3½d. per bush.).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent (Dec.-Jan.), 37s. 6d. per ton (1s. 0½d. per bush.); to South Africa, new season, 28s. 9d. per ton (9½d. per bush.).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Department reports on November 1st:—

BUTTER.

The supply of cream to hand this month has been exceptionally large, and the quality has been excellent. Owing to this, and the very careful grading, there has been a very great demand for butter, the ruling prices for the month being superfine, 1s. $\frac{1}{2}$ d. per pound; pure creamery, 11 $\frac{1}{2}$ d. per pound.

A. W. Sandford & Co., Limited, report on November 1st—

BUTTER.—The rainfall for 1912 to date is 3in. less than the average, and some parts of the State are feeling the effects of this decided shortage. On the whole, however, supplies of butter and cream increased considerably, and values maintained with a very slight easing. Best factory and creamery, fresh in prints, sold at from 11d. to 1s. $\frac{1}{2}$ d. per lb.; choice separators and dairies, 10d. to 11d.; store and collectors, 9 $\frac{1}{2}$ d. to 9 $\frac{3}{4}$ d.

EGGS.—Extensive buying orders on this market, together with local picklers putting away for future requirements, have caused values to hold up well. The market closed at 10d. per dozen for hen, and 10 $\frac{1}{2}$ d. for duck.

CHEESE.—Matured samples are scarce, but new make is coming along very freely. All the latter offering is readily cleared at 7d. to 7 $\frac{1}{2}$ d. per lb., while matured is selling at 10 $\frac{1}{2}$ d. to 11 $\frac{1}{2}$ d. per lb.

BACON AND HAMS.—Values have continued firm throughout the month, and the good prices here have attracted consignments from other States. Best factory cured sides realised from 10d. to 10 $\frac{3}{4}$ d. per lb.; hams, 1s. to 1s. 1d.

HONEY.—New season's take is now arriving, but the brisk demand is rapidly absorbing all lots at 3 $\frac{1}{2}$ d. per lb. for prime clear extracted; second grades dull at 1 $\frac{1}{2}$ d. to 2d.; beeswax, 1s. 3d.

ALMONDS.—The sale is somewhat slow, but the inquiry for kernels is good. Brandis are selling at 5 $\frac{1}{2}$ d. per lb.; mixed soft shells, 5d.; and kernels, 1s. 3d. per lb.

LIVE POULTRY.—Although increasing quantities were received, the supply was not nearly equal to demand, and buyers, therefore, bid keenly for all classes. Good table roosters realised 3s. 6d. to 4s. each; hens and cockerels, 2s. 6d. to 3s.; ducks, 3s. to 3s. 6d.; geese, 4s. 6d. to 5s. 6d.; pigeons, 9d.; turkeys, 10d. to 1s. 1d. per lb. live weight for fair to prime table sorts.

CARCASS MEAT.—The season for this line is practically over, the weather now being too risky to enable consignors to forward in safety. However, the consignments received, provided quality was right, met with a good market. Bright handy size shop porkers fetched 6 $\frac{1}{2}$ d. to 7d. per lb.; good baconers, 6d. to 6 $\frac{1}{2}$ d.; heavy and light sorts, 3d. to 4d.; nice dairy veal, 3d. to 3 $\frac{1}{2}$ d.; medium quality, 1 $\frac{1}{2}$ d. to 2d.

POTATOES AND ONIONS.—The month of October witnessed the culminating point in the shortage of potatoes, and prices reached their highest level. Gambier supplies are now exhausted, and new season's locals are beginning to make their impression on the market. Onions—On account of importations from abroad the price for onions has not advanced beyond last month's level. New season's onions are now being marketed. Present quotations—Potatoes, £15 10s. to £16 per ton on trucks, Adelaide or Port; onions, £16 to £22 per ton on trucks, Adelaide or Port.

RAINFALL TABLE.

The following table shows the rainfall for October, 1912, at the undermentioned stations, also the average total rainfall for the first ten months in the year, and the total for the ten months of 1912 and 1911 respectively:—

Station.	For Oct., 1912.	Av'ge. To End Oct.	To End Oct., 1912.	To End Oct., 1911.	Station.	For Oct., 1912.	Av'ge. To End Oct.	To End Oct., 1912.	To End Oct., 1911.
Adelaide	0.96	18.51	15.92	14.15	Hamley Bridge	0.97	14.58	11.60	12.03
Hawker	0.94	10.25	9.01	7.72	Kapunda ...	1.33	17.75	14.69	13.27
Craddock	3.73	9.33	9.03	6.75	Freeling	0.96	15.93	13.90	12.44
Wilson	0.97	10.06	8.98	6.35	Stockwell ...	1.16	18.23	17.27	14.27
Gordon	2.06	7.60	8.77	6.53	Nuriootpa ..	1.02	19.08	16.46	12.07
Quorn	1.31	12.01	13.40	7.18	Angaston ...	1.64	19.44	20.42	18.75
Port Augusta	1.27	7.95	8.98	7.46	Tanunda ...	1.94	19.81	24.70	19.59
Port Germein	1.34	10.76	9.36	9.20	Lyndoch ...	1.37	20.62	18.64	15.89
Port Pirie ...	1.23	11.32	8.94	11.49	Mallala	0.60	14.95	11.68	13.44
Crystal Brook	1.01	13.41	11.77	13.41	Roseworthy ..	0.85	15.53	11.67	11.20
Pt. Broughton	0.87	12.69	10.59	11.39	Gawler	1.28	17.29	14.12	11.84
Bute	0.87	13.72	10.44	14.40	Smithfield ...	0.87	14.55	12.55	12.28
Hammond ..	1.62	9.34	9.07	11.15	Two Wells ..	0.39	15.94	9.74	10.71
Bruce	1.56	7.67	10.12	6.19	Virginia	0.64	15.71	12.38	11.45
Wilmington ..	1.66	15.76	16.37	13.82	Salisbury ...	1.21	16.55	15.09	14.82
Melrose	2.02	20.58	17.44	15.21	Teatree Gully	1.45	24.81	11.25	17.17
Booleroo Cntr	1.65	13.88	10.51	9.07	Magill	1.29	22.78	18.66	17.20
Wirrabara ...	2.15	16.56	15.85	11.49	Mitcham ...	0.89	23.83	16.07	16.27
Appila	1.70	12.77	15.31	10.90	Crafrers	2.51	42.34	34.14	36.80
Laura	1.62	15.67	12.44	13.15	Clarendon ..	1.06	35.96	22.14	26.28
Caltowie	1.99	14.95	12.02	13.78	Morphett Vale	0.51	21.11	15.07	18.05
Jamestown ...	1.85	14.94	15.80	15.20	Noarlunga ...	0.37	18.30	15.19	17.78
Gladstone ..	1.33	13.86	11.24	13.15	Willunga ...	0.59	23.76	18.09	23.49
Georgetown ..	1.14	16.09	14.14	14.21	Aldinga	0.41	18.17	13.60	16.46
Narridy	0.97	15.00	11.91	14.55	Normanville ..	0.58	18.82	14.01	17.24
Redhill	1.61	14.60	13.93	12.38	Yankalilla ...	0.50	19.92	17.36	21.68
Koolunga ...	1.22	13.71	12.33	12.02	Eudunda	0.76	14.94	14.02	13.52
Carrieton ...	1.58	10.14	9.75	8.69	Sutherlands ..	0.35	—	8.77	8.07
Eurelia	1.16	11.24	10.75	8.88	Truro	1.50	17.39	20.19	14.51
Johnsburg ...	1.07	8.24	9.23	7.19	Palmer	0.75	—	14.34	10.93
Orroroo	1.39	11.64	10.26	7.59	Mt. Pleasant.	1.21	24.66	21.38	18.63
Black Rock ..	1.40	10.19	10.00	8.18	Blumberg ...	1.70	27.12	22.49	20.60
Petersburg ...	1.55	11.00	11.28	9.40	Gumeracha ...	2.02	30.18	25.96	23.74
Yongala	1.79	11.75	10.75	10.72	Lobethal ...	2.25	32.96	25.81	25.21
Terowie	1.81	11.47	10.46	9.98	Woodside ...	2.46	28.71	28.19	25.37
Yarcowie ...	1.10	11.74	10.87	11.28	Hahndorf ...	1.50	32.53	22.73	29.38
Hallett	0.98	14.33	11.77	12.41	Nairne	1.11	26.32	20.43	25.51
Mount Bryan	0.80	13.95	12.80	11.30	Mount Barker	1.21	28.44	23.22	25.92
Burra	0.85	15.93	14.92	13.63	Echunga ...	1.25	29.86	23.16	28.85
Snowtown ...	0.74	13.93	11.17	10.19	Macclesfield ..	1.21	27.72	27.47	25.52
Brinkworth ..	0.90	13.06	12.30	12.33	Meadows ...	1.54	32.28	26.37	30.09
Blyth	0.90	14.34	10.81	14.22	Strathalbyn ..	0.82	17.18	14.69	18.17
Clare	1.56	21.93	16.92	19.17	Callington ...	0.47	14.15	8.88	11.39
Mintaro Cntrl.	1.42	19.99	14.61	17.50	Langh'rne's B.	0.51	13.62	8.73	11.39
Watervale ...	1.86	24.70	17.72	20.82	Milang	0.46	15.05	8.32	9.85
Auburn	1.89	21.71	14.06	18.40	Walleraro ...	1.22	12.45	13.46	14.45
Manoora	1.23	16.40	11.48	12.57	Kadina	1.14	14.46	12.69	13.44
Hoyleton ...	1.11	16.32	10.00	13.77	Moonta	0.87	13.71	11.91	12.45
Balaklava ...	1.51	14.19	9.79	12.83	Green's Plains	0.45	14.32	10.05	10.36
Pt. Wakefield	0.67	11.67	9.22	14.68	Maitland ...	1.28	18.29	13.64	17.18
Saddleworth	1.25	17.85	12.14	13.06	Ardrossan ...	0.76	12.54	10.54	11.45
Marrabel ...	0.60	16.07	10.47	10.20	Pt. Victoria ..	1.04	13.69	11.74	14.51
Riverton ...	1.53	18.42	13.02	15.14	Curramulka ..	0.35	17.24	11.28	14.43
Tarlee	1.61	15.52	13.36	11.87	Minlaton ...	0.42	16.04	11.42	13.75
Stockport ...	1.13	14.36	12.16	10.56	Stansbury ...	0.64	15.51	12.91	15.44

RAINFALL TABLE—*continued.*

Station.	For Oct., 1912.	Average to End Oct.	To End Oct., 1912.	To End Oct., 1911.	Station.	For Oct., 1912.	Average to End Oct.	To End Oct., 1912.	To End Oct., 1911.
Warooka ...	0.46	15.37	10.96	18.63	Bordertown .	0.91	17.58	13.08	13.28
Yorketown .	0.59	16.15	11.89	15.19	Wolsley ...	0.96	15.70	13.41	11.95
Edithburgh .	0.53	15.00	11.25	13.65	Frances	1.05	18.09	16.72	17.14
Fowler's Bay	0.81	11.26	9.78	12.35	Naracoorte .	1.65	19.95	19.78	17.97
Streaky Bay	0.91	14.20	14.34	15.34	Lucindale ..	1.61	20.62	20.82	20.52
Pt. Elinston .	3.46	15.05	17.12	17.55	Penola	1.94	23.85	22.11	22.33
Pt. Lincoln..	0.75	18.54	18.16	16.79	Millicent ...	1.45	26.29	23.11	29.47
Cowell	1.06	10.64	9.22	10.30	Mt. Gambier.	1.77	28.09	25.56	30.30
Queenscliffe .	0.43	16.86	14.76	—	Wellington .	0.58	13.30	9.65	10.77
Port Elliot .	0.60	18.71	14.33	15.79	Murray Bdg.	0.47	12.40	8.76	9.78
Goolwa	0.90	15.96	15.28	16.75	Mannum ...	0.24	10.43	5.92	6.67
Meningie ...	0.53	17.09	13.08	13.76	Morgan	0.27	7.62	6.63	7.18
Kingston....	2.10	22.09	28.05	20.61	Overland Crnr.	0.14	9.46	7.10	9.80
Robe	1.34	22.59	17.73	21.07	Renmark ...	0.14	9.14	6.71	9.45
Beachport...	1.31	24.69	19.83	26.66	Lameroo ...	0.95	—	13.21	12.37
Coonahpyn ..	1.24	15.67	13.78	13.10					

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of over 6,000 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

THE AGRICULTURAL BUREAU.

TWENTY-FOURTH ANNUAL CONGRESS.

(Continued from page 343.)

WEDNESDAY, SEPTEMBER 11.

The Congress was resumed at 10 a.m. on Wednesday, September 11th, there being a large attendance of delegates. The Chairman of the Advisory Board of Agriculture (Mr. A. M. Dawkins) presided.

SOME COMMON PARASITES OF LIVESTOCK.

Mr. F. E. Place, M.R.C.V.S., B.V. Sc. (Government Veterinary Lecturer), delivered the following address on "Some Common Parasites of Livestock":—

I venture to hope that the remarks I am about to make concerning some of the more common pests of the lower forms of animal life which affect our farm animals in South Australia may not be altogether without profit. My reasons for selecting this subject are twofold. First, because during my residence in this State I have noticed that common knowledge concerning them is not as accurate as it should be, and that in many cases a totally false impression concerning their importance exists—often those which cause a serious economic loss are ignored, while on the other hand those whose presence is really not very harmful are credited with being the harbingers of ills untold among stock, while many which do not affect stock at all are looked upon as scourges. This unsatisfactory condition of things is no doubt due to the fact that these small pests have been treated, like some subjects in the Bible, as things not to be mentioned in polite society; or owing, perhaps, to the unfortunate habit prevalent among scientists of bestowing most awe-inspiring names upon them, the man on the land has felt shy of having anything to do with them or their life history; whereas if they had been introduced to him as flies or worms he would have taken a keen interest in them, and by his observation added much useful knowledge to the somewhat scant information which we possess concerning many of them. My second reason is a personal one—that for many years I have found the study of the life history of these "little foxes" a fascinating hobby, not unmixed with practical utility, whereby I have been able from time to time to set forth the connection between these forms of life and the symptoms of diseases which have been thought to be of obscure origin; and therefore I feel that I may speak to you

about them with a little more confidence and self-assertion than would be justified were I to discourse upon matters less familiar. And in South Australia I have found one of the most charming fields for the investigation of worms that it has ever been my good fortune to alight upon, for truly here their name is legion. Although in the title of this address I have used the Greek form of their name, I have done so against my own inclination, and would far rather have spoken of them as flies and worms; but unfortunately these two good Anglo-Saxon words do not quite include some of the forms of life about which I shall want to say a little, and therefore for brevity's sake I have used the more comprehensive, if less comprehensible, term.

CLASSES OF PARASITES.

Parasites may be described as uninvited guests, and to facilitate description the methods of life which the host—the carrier of the lower form—and the uninvited guest live together are usually divided into three classes. First, when both benefit from the partnership, like the crocodile on the Nile and the little bird which picks its teeth, or the sheep and the starling. But with this form we have little to do. The second results in an advantage to one of the parties without harm to the other, a kind of Dives and Lazarus arrangement which need not occupy our attention. The third is the form in which we are more immediately interested, in which the residence of the uninvited guest is fraught with more or less unpleasant results for the host, and in these remarks I must confine myself to comparatively large guests, such as one can well see with the naked eye or by the help of a pocket lens. Time and the occasion do not permit of reference to those microscopic forms which require high magnifying powers and special methods of preparation for their demonstration.

We are dealing to-day with things that we can see and handle, and these we will for convenience again subdivide into three classes—

The first are lowly, one-celled bodies, whom individually we cannot recognise by the naked eye, but whose colonies we can readily see in the spotty livers of rabbits or the gullets of sheep. They have no common name; but, tiny as they are, rejoice in the lengthy titles of *Coccidia* and *Sarcosporidii*, which we may fairly turn into English as tiny dots and specks in the flesh. The former we find in the internal organs and the latter in the meat, and we will refer to them at a later stage.

The second are worms, which are numerous, and will require considerable attention. We shall divide them into flat worms and round worms, and subdivide them into numerous families.

The third are creatures with jointed legs, such as we commonly call insects; but for the moment I would discard this word for the more cumbersome description just given, because I must use it as a special name for groups which have in common bodies divided into three sections—head, chest,

and belly—which possess three pairs of legs, and often possess one or two pairs of wings; while the other branch of this third group have a head and chest combined and a belly, and upon their front section carry four pairs of legs. The insect class we may typify by a fly, and the four-legged class by a spider. To the latter belong all the mange and similar mites, with many larger ones, while the former will hold lice and fleas, and such small cattle.

The terms of tenancy of these guests are very varied; some live upon the outside of their hosts, some upon the inside; some spend their whole existence upon one host, others wander to different hosts, and in this way often act as the carriers of disease in a way I will touch upon more fully when speaking of some of the flies and fleas.

LIFE HISTORY.

In working out the details of their life history we find that we have many factors to consider. Time of year and character of the season often greatly modify their existence and numbers; some live in the air, like the bot fly; others pass part of their existence in the earth, like the blood worms; many are carried by water, such as round worms and flukes. The character of their eggs often has a marked influence upon their spread; those of the thin-shelled variety generally hatching out outside the animal body and invading their hosts in the early stage of their life outside the egg; while those in the thick-shelled sort are swallowed in their shells and hatch out inside their host, as in the case of the long, round worm of the horse; while others circulate in the blood stream, and finally rest in some selected spot in which to undergo development as in the case of the worm nodule in the bullock's brisket, which so upset the English press some few months ago. Some seek their resting place direct and settle down in it without further fuss, like the little pest which prefers the white parts of cattle for its home; while in yet other forms a special instinct seems to be at work, as in the warble maggot, fortunately unknown in Australia at present, which wanders from the bullock's gullet through its chest walls till it finally develops under the skin of the back.

To give you some idea how these pests multiply, I may mention that in eight weeks a louse may become the grandmother of 5,000, and in her lifetime the progenitor of 150 millions. One of the commoner blood worms often emits 30,000 eggs; figures which throw some light upon the enormous rate of increase which might and does occur if the conditions are favorable; but, thanks to a kindly Providence, as a rule the death rate generally keeps pace with the birth rate, else Commissioners of Crown Lands and Lands Settlements Boards would find their occupation gone. Yet the death rate has to fall off but very little to account for an enormous increase in these pests, which also can lie dormant for very considerable periods of time. A story runs that an attendant engaged in unrolling the mummy of an ancient Pharaoh contracted the itch from his majesty's wrappings; but whether this

be true or not, it is no uncommon thing for eggs of worms to lie dormant in the mud of dams and such congenial places for four years, while others can be frozen and unfrozen without interfering with their vitality.

Luckily, however, this tenacity and vigor is materially discounted by the vital forces of the host, and in most cases probably the invaders are digested as part of an ordinary ration, or their eggs poached by the rays of a South Australian sun. But it may be taken that as a rule young animals are less capable of resisting the attacks of these pests than mature stock, while the constitution of the host has a marked action on the development of the pests; though, on the other hand, if they begin to make headway, they impair the most vigorous constitution, and form surroundings more to their taste; while seasons have a decided influence for good or bad. And one should perhaps mention it with bated breath at a Congress of South Australian farmers, but much depends on the hygienic surroundings of the hosts; and can it be said that in the majority of cases in this State that the surroundings are hygienic? Are those heaps of soft, comfortable horse dung, stirred by rolling teams or wafted by gentle brickfielders, entirely devoid of eggs or worms? Are those dams whose edges have crumbled under the hoofbeat of many a head of stock, wholly innocent of the larvæ of blood and other worms? I fancy if the money that goes to buy worm powders were to purchase shovels and brooms, or were expended in water lifts and troughs, that in a few years' time there would be less heard of blood worms and their doings, there would be young stock with the bloom of health upon their coats instead of dejection and misery writ large upon their forms, and in the long run elbow grease and foresight would be found to be cheaper than santolin or tartar emetic; and I am quite sure that they would be more effective.

The farmer may say, "Oh yes, all this is very interesting to a man sitting in his laboratory, but what use is it to me who want to know how I can tell whether the horse has got lice or if his inside is rotten with blood worms?" It would be impossible in the scope of an address such as this to go into detail as regards the signs by which one can recognise these things, but in every case there is one infallible sign, namely, the presence of the pest itself. It is easy to know that the bot fly is about, though eight months later it may be difficult to tell how many of its larvæ are hanging on to the inside of the stomach of one's favorite colt. No one can err in declaring that a mare has worms when one finds one 8in. or 9in. long on the dung she has just passed; but it is not so easy to tell whether she is breeding thousands inside her as fine as thread and only half an inch long; and looking at a patch of dung in a hundred acre paddock will not help much; neither can lice be seen by a casual glance in at the stable door; but in all these cases a careful and systematic search will enable anyone to demonstrate the presence of the pests if there. Then if there is still a doubt, a little tinful of the dung, or a tobacco tinful of the scrapings and hair sent to the Chief Inspector of Stock direct

or through the Secretary of the Advisory Board, will enable the veterinary officers of the department to give a definite opinion. In rough outline, when pests are upon the skin there is itching, loss of hair or wool, and loss of condition; when they are inside the body there is loss of condition, bloodlessness, frequently diarrhoea, and failure to respond to good feeding. In certain cases where there are definite symptoms I will refer to them when dealing with the particular pest to which they are applicable.

NECESSARY PRECAUTIONS.

The manner in which these pests derive their sustenance varies with the character of the parasite. On the skin, for instance, some merely hide under the hair and feed on the waste of the skin, others burrow deeply into it. Many internal worms simply lie in the passages they prefer, and derive their living from the substances with which they are surrounded; others burrow into the tissues of the organ and use them for their home and provender. Many, both outside and inside, actually suck the blood, and though their individual efforts are small, in the aggregate they work considerable mischief.

Owing to the varied effects of the different kinds of pests, it is well to obtain expert opinion as to the sort with which one has to deal, and to learn the best ways of preventing their attack or of lessening the ill effects which may arise therefrom. But at the risk of repetition I would point out that the great preventive is cleanliness of the animal and its surroundings. Carelessness in the disposal of the eggs of these pests is at the bottom of nine-tenths of the mischief that they do in South Australia. The drinking up of thousands of tiny maggots stirred up in the mud of the edge of the dam, will certainly result in some at least finding a congenial home. The slap-dash use of the brush, first upon a lousy colt and then a clean one, will be an effectual way of carrying the mischief-makers over. The close cropping of the grass, near the roots of which are lying the immature flukes, will certainly result in the infection of the flock. The careless flinging of the paunch with its little watery cysts to the expectant sheep dogs will rebound in their becoming affected with tapeworms, which in turn will spread the disease a thousand-fold.

HABITAT.

But we have spent enough time on these generalities, and must proceed to deal with certain of the commoner pests in more detail, so that practical good may issue from this dissertation; and that this may be the more readily referred to, I propose to mention the districts of the body upon or in which the various kinds of pests may be most frequently found, and briefly touch upon their form and habits and the means to be taken to eradicate them or minimise their bad effects.

EXTERNAL PESTS.

Naturally one commences with the skin. Upon or in the substance of the skin of our farm animals one is again able to divide the parasites into three main groups. First come insects, either perfect or in larval stage, including fleas and lice. Then the spider family of ticks and mange mites, with one or two less familiar forms. Lastly, few in number, worms. And not belonging to the category of to-day's pests, low forms of plant life which produce ring-worm.

Among the flying insects we may take a glance at the gnats and flies, which buzz, suck blood, and come in swarms. Many of these prefer the evening for their wanderings, and seek their hosts in the open paddock. They annoy, and often carry disease upon their beaks; but under South Australian conditions little can be done to get rid of them beyond treating animals in work, which may carry leaves or rags or nets to frighten them off, and the e may be dressed with strong-smelling essential oils such as tar, turpentine, eucalyptus, or various disinfectants. Perhaps the most effectual way to keep them off is dense smoke. Next, we find a family of flies, fairly small, and not at all vicious in appearance, which buzz and prefer the shade of the stable; but they bite and raise little lumps which soon disappear. They are known as breeze flies, or *Tabanidae*, and in other countries work havoc by feeding on animals in whose blood are microscopic parasites, which are thus transferred to healthy hosts upon the sucker of the fly.

In South Australia the freedom of stock from this class of disease keeps the flies in a fairly harmless condition; but the tropical conditions upon our northern borders are very favorable to the introduction and spread of such disease, and should they come, the flies may carry them southwards; so, as prevention is better than cure, it is well to keep the breeding of these flies in check. The formalin method described in detail in a recent number of the *Agricultural Journal* is simple, cheap, and effective.

Students of Kipling and anti-suffragettes will rejoice to note that the mischief-workers are always the "female of their kind." A larger breed, like small bluebottles ("Stomoxys") and the stable fly, are less sociable and work singly, as a rule, and up to the present have not been found guilty of mischief in this State, though in Africa and Asia they are in the forefront of the ranks of dangerous disease carriers.

Next we come to a curious family of flies, one of which is wingless, and is commonly known as the sheep tick, but is not a tick at all, and will be noticed in more detail in a few moments. The other is the little squat fly which runs and tickles horses so, especially under the tail, finishing its attentions by a sharp bite, which not infrequently evokes a protest in the way of a kick, or a fling of the tail over the reins and a bolt. Next come the families of shining bodies and generally woolly legs, who themselves are only indirect authors of evil by laying their eggs in wounds and so forth, that their

maggots may find plenty of food for their voracious appetites when they hatch out. The presence of these flies in the summer makes it imperative to dress wounds such as result from injuries or castration with substances like tar, to keep off the pests. In this family we find the flies which work such havoc among sheep in the neighboring States—*Lucilia serricata*, of blue body, and relations of similar form. No doubt short docking favors the attention of these pests, and their relative infrequency in this State is probably due to the tails being left somewhat longer here. Though not habitually offal eaters, much preferring the living tissues, they do at a pinch survive on dead meat, which is the favorite breeding-ground of their cousins; and it is bad practice to leave fly-blown carcasses about, though it still continues to be done in spite of repeated warnings from Virgil downwards, for every fly developed means thousands more in a very short time. As preventive dressings, one may recommend arsenic dips and attention in the way of dagging. As treatment, I prefer strong solutions of corrosive sublimate.

The next family is that to which the bot fly belongs, and will be noticed in fuller detail directly. These flies are not blood-suckers.

Lastly there are the gad flies, so often confused with the bot flies, but which are blood-suckers, and whose bites cause serious annoyance to both cattle and horses.

The fleas are blood-suckers, and are not of much importance to us to-day, although at times sources of great annoyance to horses in their heels; our friend the dog has also to put up with a great deal of annoyance from them, and one form of tapeworm from which he suffers passes part of its life in the flea. They demand much keener attention from doctors, as they are implicated in the dissemination of plague.

The next family, the lice, are of much more practical interest, for different members of the family affect all our animals. They are insects without wings, and therefore remain for the most part upon the animal upon which they are bred, their transference being by contact with other animals, in which way emigration is very actively carried out; and in this State there is a danger of their becoming a very serious economic pest upon sheep if farmers neglect to loyally assist the Stock Department in the efforts of its officers to control their spread. Though I have no wish to pose as an alarmist, I can easily imagine them becoming as serious a menace to the wool industry as scab was formerly. Lice have sucker mouths, and live upon blood and waste thrown off from the skin. The horse harbors three kinds, one of which is rare in this State. The other two are, unfortunately, common; the larger is grey, and the smaller yellowish. Cattle are also the proud possessors of three sorts, the commonest being the one commonly found upon calves, which is a chestnut color. In both horses and cattle they are easily got rid of by oily dressings, which suffocate them, but must be repeated from time

to time as new families hatch out. Tobacco water is also very fatal to them.

The sheep louse, to which I referred a moment ago, rejoices in the name *Trichodectes sphærocephalus*, which is many times longer than himself, he, or rather she—for again the fair sex is the greater sinner—being about three-twenty-fifths of an inch in length. The color is whitish-grey; the head rusty color, and broad as compared with the body. Repeated dippings with, as the Chief Inspector of Stock points out, poisonous dips—especially arsenical—will soon eradicate the pests; and as a practical authority on dipping his reputation has travelled far beyond this State, his recommendations being adopted in the Indian Empire; so that I would earnestly recommend farmers to listen to his warnings and carry out his instructions. The symptoms have so recently been described, and unfortunately in many parts may be seen upon affected animals, that I need not dwell upon them here, merely mentioning that a lousy ram will quickly infect a flock. The old country plap of oily raddle or black, in addition to marking his ewes, will kill many lice upon the parts from which they are likely to spread.

The practical observation that lice are most frequently seen on Lincolns, Shropshires, and so forth, rather than on the Merino, has a great interest and practical bearing, for it points to the strength of the Merino yolk being inimical to the development of the lice, and provides a practical hint as to the extermination of the pest should it get out of bounds. The observation is corroborated by laboratory experiment.

It is convenient here to refer to the wingless fly I mentioned a little while ago, generally spoken of as the sheep tick. This is a much bigger object than the louse, being nearly one-fifth of an inch in length, and brown in color. Its eggs, which hatch out about once a week, can be seen like tiny apple pips on the ends of the wool points, which indicate the presence of the insect on the fleece. It succumbs more easily to dips than the louse, but the dip must be well worked into the wool.

The pig harbors the biggest of the louse family, and in bad cases they seem to be running out of his eyes and nose. The homely remedies of oil and vinegar will effectually end their career.

THE ACARINÆ.

We may here leave the insect family as a whole, reverting to them for a few minutes when we touch upon bots and similar grubs, and turn our attention to the eight-legged spider family, the *Acarinæ*, among which we shall find many of the greatest economic import, of which we may mention the tick which spreads Queensland redwater and the mite which causes sheep scab in other countries; not here, for which you have to thank the vigilant action of your Stock Department, against whose orders, I regret to find, there is sometimes a tendency to rebel, which surely should not be the case when those orders bear the names of Valentine, Needham, or your present Chief Inspector—men whose administrative ability, backed by their practical

experience, should surely merit your fullest confidence and most loyal co-operation.

The life cycle of these pests is generally this: The egg produces a six-legged larva, which moults into an intermediate nymph, which in turn becomes the perfect eight-legged creature, from the sexual union of which proceed the fertile eggs of the next generation.

THE TICKS.

The largest members of this family that we deal with are the ticks, and luckily they do not appear to be responsible for much harm in South Australia among farm stock, although they maintain their bad reputation among poultry. But in Queensland they act as the carriers of the microscopic organism which breaks up the blood cells and causes the ravages of Queensland tick fever. The way ticks bite is of interest as explaining how they manage to carry disease. They saw their way into the skin, and then hang on by spreading out the blades of the saw, as it were, and between these they eject an irritating fluid which contains the organisms and brings a flow of blood to the part. This explains the difficulty one has in removing the head of a tick from a dog or other animal, and why it causes such an irritating sore when not removed. The sexes unite on the animal, and the egg-bearing female drops to the ground when ready to lay. She produces hundreds of seed ticks in the course of 15 to 20 days, and then shrivels up and dies. The seed ticks climb up blades of grass and so forth, and attach themselves to the hair of passing animals, and so are carried to new pastures. Should a large animal not pass their way, they are not averse to hiring a bunny as a means of transport to more favored climes.

The male tick is smaller than his mate, and flat. As a rule the various moultings take place upon the same animal. Dipping with arsenical dips, followed where possible by oily dressings, is effectual in destroying ticks, and tick-infested country may be cleared of them if it can be kept free of stock for 18 months; but this is a big proposition in a land where rabbits and kangaroos and such small deer may form temporary homes for the ticks and carry them all over the country.

A much smaller member of the spider family is the teatree tick, which is only too well known in the South-East. Almost microscopic in dimensions, it seems endowed with unlimited powers of irritation, both for man and beast. The unendurable itching which it causes may be quickly relieved by applying naphtha in some form, a convenient way being to dissolve some of the so-called camphor balls in oil or methylated spirit.

MANGE MITES.

The mange mites follow the rule of three, and form three groups which may readily be differentiated under the microscope—the *Sarcoptes* being roundish,

with short legs, the last pair of which are hidden under the belly; the *Psoroptes* are oval, with thick legs, all visible, and lobes at the lower end of the belly; and the *Chorioptes* have oval bodies and long, thin legs. Most of these mange mites go through their life cycle in six to 10 days, and hatch out in 24 to 48 hours. A member of the first generation, leaving 10 females and five males, at the end of 15 days will, in the sixth generation at the end of 90 days, be responsible for a million females, and half that number of males, populating Australia with a vengeance. Their presence is indicated by intense itching and loss of hair, quickly followed by loss of condition.

In the horse the *Sarcoptes* quickly spread all over the body, and, running about, cause the animal unendurable uneasiness, and may easily be spread to his neighbors. The *Psoroptes* confine themselves chiefly to the mane and tail, producing the so-called sweet itch, with the loss of hair and thickening of the skin due to the irritation of their burrowings. The *Chorioptes* affect the hair of the heels, and produce a form of grease without over much irritation. Scab in sheep is due to a family of *Psoroptes*, while in many instances the so-called but mis-named "cuckoo scab" is the result of the presence of *Sarcoptes*.

All these mites love the sun and warmth, so that when treating them it is advisable to have the animal out in the sun some time before applying the dressing, so that they may have come out to the surface in larger numbers and be more easily attacked; and it is well to break up their homes with an alkaline solvent such as washing soda which, with soap lather, soon chokes and kills them, or leaves them helpless to escape from the more drastic dressings such as arsenic solutions or tobacco water; while naphtha or benzine and oil will quickly allay the irritation their presence may have caused.

The last members of these animal external pest families we shall notice carry the name of *Demodex*, and produce similar effects to the ones just noticed, and in the dog cause a most persistent form of mange. But the members of the family of most interest to us prefer the white parts of cattle, where they live and multiply without causing much uneasiness; but should they take a fancy to the horse, and settle on a blaze, for instance, he will show by his rubbing and the consequent loss of skin how irritating they may be.

The worms which invade the skin are either not frequent in South Australia, or I have not yet had the good fortune to encounter them. They need not occupy our attention to-day.

Before leaving the skin, one must just notice in passing the low plant forms—moulds—which produce various forms of ringworm, not common in horses, though more northerly one form at least occurs fairly frequently. Probably "seedy toe" is due to one of these low plants. When they occur in animals they are frequently transmissible to man, which is especially the case with the form so common in mice, as was noticed last year; and there is a possi-

bility that they may be able to modify their form of existence and grow inside the bowels and take part in a form of poisoning common in South Australia.

INTERNAL PESTS.

Enough has been said about those parasites which live on the outside of the animal, and we will now turn to those whose residence is within, and therefore about which there is less accurate knowledge and a tendency to romance, founded on lack of facts.

Living in the digestive organs we find the one-celled *Coccidia*, tape worms of many kinds, two sorts of flukes, and numerous families of round worms, which may be grouped round types like the big round worm, the whip worm, the thread worms, the palisade or blood worms, the nodule formers, and one which, in the rat and pig, finds its home in the flesh. The tape worms of some animals spend the early days of their existence as watery bladders or cysts in others.

Following the regional plan, we will glance first at the mouth, at the back of which it is not uncommon to find leeches hanging on to the softer parts of the throat, and causing considerable disturbance. Salt dislodges them ; but when they are numerous or troublesome the horse should drink through a bag, as recommended by an old Arab horse doctor nearly 500 years ago. In the gullet of cattle and sheep one often sees the little white specks which are the fortified walls of the castles of a tiny worm, or the remains of a colony of one-celled animalcules. Passing to the stomach of the horse one very often finds in it tumors varying from the size of a pea to that of an egg, which are caused by a thread worm closely related to the one found in the beef nodules.

BOT FLIES.

One also finds bots, the larvæ of a fly which does not suck blood or bite or sting, but which glues its eggs upon the hair of the chin or legs most often, whence in a few days the grublets emerge to find their way into the stomach and develop into the well-known grubs called bots, whose history I have repeated so often quite lately that I may well be excused from reiterating it to-day. But a few moments may be devoted to the description of the most common of the bot flies, *Gastrophilus equi*, a medium-sized fly with a woolly, beelike body and fawn-colored bands, with rusty-colored feelers, often mistaken for its sting, an organ it does not possess ; its breast is blackish-red with black bands, its belly yellowish-brown with black spots, and the wings striped with a smoky vein and edges ; the hinder end of the male is blunt, but of the female pointed, curled under her and provided with two long projections, also often mistaken for a sting, which are used in the delivery of the eggs and their attachment to the hairs. It is no uncommon thing to find 250 to 1,000 bots attached to a stomach.

There are in this State at least three different kinds of bot fly, one of which prefers to lay its eggs so that they can develop in the lower bowel, and another whose larvæ prefer the small bowel to the stomach, and are not averse to sojourning in the gullet either.

Prevention and treatment have been so fully laid before the public upon quite recent occasions, and are available in the *Journal*, so need not occupy our time to-day.

In cattle and sheep we do not find bots in the stomachs, but frequently thousands of tiny thread-like worms belonging to several families, which often riddle the lining of the stomachs right through and cause very severe diarrhœa and serious changes in the blood. They are responsible for numberless deaths, especially among calves and lambs. Both the worms and their eggs are voided, and thus pastures become infected. Overstocking is a certain means of inducing a very serious outbreak. Of all the drugs which have been recommended from time to time, arsenic is the most likely to do good, and when a flock is affected every lamb should have one or two grains daily for a fortnight. A rough and ready way of dispensing and giving this is to dissolve a pound packet of Cooper's dip in 2galls. of hot water, and give from a dessertspoonful to a tablespoonful to each lamb, according to age, every morning. As damp favors the development of the worms in every way, removal to dry pasture is essential.

Passing on to the bowels, we find a great variety of worms capable of living in them; in fact, it is in this tract that we find the majority of worms, flat, round, or threadlike. There are three kinds of tape worm found in the horse, generally in the first portion of the large bowel. They differ from one's ordinary notion of a tape worm in so much as they are rarely more than 2in. long, and broad for their length, with a curious little round head; they are often mistaken for flukes, which, indeed, they somewhat resemble; but they are yellowish-white instead of brown, and on close inspection will be found to consist of transverse segments, as do all tape worms.

In the small bowels we find the common large, round worm, technically described as the bigheaded variety; but in practice one has to look carefully to find which is head and which tail. They vary in length from 8in. to 16in., and lie in the bowel tube, gaining their living from the juices which flow past them, and as a rule do not do much harm, unless they are present in large numbers, when they cause a chronic catarrh of the bowel, with diarrhœa, and symptoms something like those of lockjaw. As many as 1,200, aggregating 7lbs. weight, have been taken from a horse. Tartar emetic and aloes generally dislodge them, but they should be burnt and not left lying about, as their eggs are very tenacious of life, and find a dung heap an excellent incubating place. Large doses of arsenic repeated daily for 10 to 14 days are also good, and ordinary bluestone is often found to be very effective.

Near the lower end of the bowel we find the whip worms, so called because their upper part may be compared to the handle of a stockwhip, and their fine tail to the lash. They vary in size from $\frac{3}{4}$ in. to $1\frac{1}{2}$ in., and are yellowish-white. They do not do much harm, and are fairly easily dislodged, either by purging with aloes or by the use of enemas; in the latter case, 1oz. to 2ozs. of turpentine in a couple of quarts of warm milk is a very effective means of disturbing them.

BLOOD WORMS.

We next come to the so-called blood worms, the hard-mouthed ones as their scientific name indicates, of which there are several varieties, three being found much more frequently than the others. They are sometimes called palisade worms from their stiff, rodlike appearance. In addition to their family name of hardmouth they bear individual names, the largest being called the horse worm, or armed worm, the smaller bearing the name of a worm with four boring points, and the third the toothless one. They are all greyish-white in color, a fact that has mislead many people, who have expected to see red ones. They do show red when they have just had a meal of blood, owing to their thin skins; but the little scarlet wrigglers one finds in water are no relation at all to them. The large ones are 1 in. to 2 in. long, and as thick as a grass stem; the others are shorter and thinner. Owing to an inadequate knowledge of their life history, they have been blamed on the one hand with causing untold mischief in the horse's inside, and, on the other hand, they have been said not to do any harm at all; as a matter of fact the truth, as usual, lies midway.

They are a very serious menace to the life of young horses, and less so to mature animals, though in no case can they be considered desirable guests, though it is by no means easy to get rid of them. Their life history is a vicious circle, and in briefly looking at it we will start from the point when the adult worms are ready to lay their eggs as they lie with their circular-saw-like heads firmly imbedded in the coats of the bowel. These thin-shelled eggs hatch out tiny microscopic worms either in the body or in mud, and these gain easy access to the blood stream either through being swallowed or born in the lining of the bowel; they go round with the blood stream till they find a suitable resting place in the arteries of the belly, especially one which supplies the big water gut with fresh blood, and here they stay and develop, using their circular saw to cut their way out when they want a change of residence; and it is while they are in the blood stream that they do the mischief, altering the character of that vital fluid, and thereby robbing the organs of their necessary nourishment, and even probably changing it from a life-bringing to a poison-bearing stream. But if in the animal's youth they have not been sufficiently numerous or active to cause acute mischief, the system grows tolerant of their presence and inured to the poisons

that they form ; hence it is no uncommon thing to find them in large numbers in horses which have evidently died from causes not in any way connected with the worms. Drugs such as tartar emetic and santonin have a deterrent effect upon their development, but are calculated to cause more harm to the animal which gets them than to the worms, especially if the animal is young. But while in India a blood disease of another nature was being treated, it was observed that the large doses of arsenic necessary in that case, and which could be well borne by the horse, were more than these worms could stand, and that although the adults might not be killed off, their broods most certainly were, and I feel certain that in recommending this drug to you, you will get better results than you have in the past. But prevention is better than cure, especially when the latter is by no means certain.

The dam-side is responsible for by far the greater number of blood worms found in South Australia, while the dung-bed of the stable probably furnishes the rest ; and it does not require a filter to be germ proof to stop them from getting into the water trough ; and a man's wages for a year cleaning the stables and yard will amount to less than the price of half a dozen valuable colts. While, too, it must be remembered that the hundreds of worms found in the blood vessels, bowels, muscles, and even kidneys of a horse are the potential progenitors of millions more.

Cattle and sheep harbor tape worms such as we generally understand them. Sheep have 12 varieties, of which two are extremely common in this State. Calves also are infested with a long, round worm, which is sometimes present in great numbers, and when such is the case it not unfrequently happens that the flesh is tainted with an unpleasant stink, although the worms are found only in the bowels.

The pig has large, round worms and several kinds of thread worms, which latter are suspected of aiding in the spread of swine fever. This animal is also infested with a peculiar form of round worm, which buries its head deeply in the coating of the bowel and spoils them for sausage skins.

The pig is also infested with a minute microscopic worm, which develops in the flesh and causes the animal great pain ; but worse than that, this *Trichina*, if eaten uncooked by man develops also in his muscles, and causes very serious disease. Fortunately in this State consumption of raw pork and other products of the pig is not common, so that the risk of human infection is small.

A useful remedy for ridding pigs of intestinal worms is $\frac{1}{4}$ oz. of powdered castor oil seeds given in a little milk and pollard ; care, however, should be taken to use only seeds deprived of their outer coat, for this is very irritating, and likely to set up inflammation of the bowels.

This is a convenient moment to glance briefly at a somewhat interesting phase of the life of certain tape worms which mature principally in the dog, but which spend the earlier part of their life in another host. This phase is

recognised by butchers, who speak of water blobs or water bladders upon the apron or caul fat or upon the skirt. These little water bladders are the early life stage of a common tape worm of the dog, while the similar watery blobs noticed upon the insides of rabbits represent a similar stage of another tape worm. Still another is found in the brain of sheep, producing "gid," with the curious stamping trot or constant turning in a circle. This again has its counterpart in the brain of the rabbit. The watery bladders commonly known as hydatids are the early life stage of a small tape worm of the dog, and unfortunately occur frequently in man as well as other animals. These cysts, as they are called, are the cause of serious disease, and care should be taken never to allow dogs to get at raw paunches and similar offal; and as dingoes and foxes are as much hosts of these worms as dogs, carcasses of animals containing these cysts should not be left about for them to get at. It is much safer to burn them, as when they have developed in the dog, and he voids them, each little maggot-like segment may produce hundreds of eggs, so that a district may soon become badly infested and serious loss of stock occur. Passing from the bowels to the liver, we frequently find it invaded by these cysts; sometimes nearly the whole of the liver substance is destroyed by them. In lamb's livers the cysts are very often small, and may be easily overlooked; but an inspection of the notch at the lower edge of the liver will often show it to contain a cyst, and in such case if the liver be cut into more will be found.

THE FLUKE.

The tiny *Coccidia* frequently attack the liver of animals and man, so that white specks in the liver should lead one to treat it as most probably dangerous for food.

The liver, especially of sheep, is the home of that interesting worm, the fluke, in shape and color like a half-penny. Its nature and life history are quite different to anything we have yet considered. Its eggs pass with the bile into the bowels, a mature fluke being the producer of 20,000 to 30,000, which pass out in the dung and hatch out in water, where at ordinary temperatures the young spends a short existence as free-swimming water animal-cule, which, coming in contact with a small water snail, burrows into its air chamber, and there changes into a bag full of living organisms, which develop into a higher form that leaves the snail and again spends an existence swimming about in water, and eventually sticks to the underside of the lower blades of grass, where it can be seen as a tiny white slimy speck, ready to be swallowed by the close-cropping sheep. And here it is of interest to notice that sheep with deformed mouths, which cannot crop close, escape becoming flukey.

The symptoms of fluke are too well known to need a description here, but it may be well to point out the four stages of flukiness. First, getting

the flukes by close cropping, especially on overstocked pastures which are wet. Second, the loss of blood and paleness. During the early stage of this period sheep may seem to fatten more quickly. Third, the rapid wasting and weakness. Fourth, the passing of flukes and eggs. Hitherto treatment has been most unsatisfactory, but during the last two years experiments have proved that the administration of extract of male fern will kill the flukes, and it is worth a trial in our South-East districts. Time forbids my going into detail of treatment here, but I shall be pleased to furnish it to those who wish.

Although I have claimed your attention for an inordinate time, I must ask you to bear with me a few minutes longer while we shortly pass in review that important class, the lung worms, just mentioning, in passing, that many of the boring worms and some of a wandering disposition may be found free in the lining of the chest and belly, and one kind finds a home in the glands of the caul fat, where the disturbances they set up result in diseases of the "dry bible" kind.

Leaving the digestive tract we turn to the breathing organs the nose, windpipe with its branches, and the lungs—for here we find the trouble popularly spoken of as lung worms; but as these will need a little more detailed description we will first glance at others which dwell in these parts. We find the *Coccidia*, to which we have referred before, and, similar in appearance, but of a vegetable nature, spores of various moulds often accompanied by the pollen grains of plants. All these go deeply into the substance of the lung and set up little abscesses.

The bot maggot of the sheep prefers the nose and the hollows of the bones of the face for its home. Popularly known as "grub in the head," it is a source of great annoyance to the sheep, which constantly stop, rub their noses with their front feet very vigorously, burying them in the earth and burrowing along in their endeavors to dislodge the offenders. This condition is sometimes confused with the cysts in the brain which cause gid; this, however, is totally different.

Occasionally wandering flukes will be found in the lungs; they are probably adventurers seeking new south poles, or out prospecting. Hydatid cysts are very common in the lungs, and during life produce symptoms which may be mistaken for tuberculosis or pleuro-pneumonia; but when an animal can be got at in the bails, a practised ear can detect the difference in the sounds of the chest.

LUNG WORMS.

Coming to the real lung worms, which are thread worms, we find there are at least eight varieties in this State, of which three are very common. Two prefer to live in the pipes of the lungs, and the third would sooner nest in the air chambers themselves, thus setting up inflammation in the lungs; and when the system is strong enough to wall them in with a limestone prison

cell, the little nodules so produced are sometimes mistaken for tuberculosis. Sheep suffering from lung worms have them in their systems many weeks before the symptoms are well marked, namely, the troublesome coughing fits, the discharge from the nose, paleness, loss of condition, and dry wool. The worms are actively breeding for two to four months of the year. Some varieties, of which one is the shorter chestnut-colored one, produce eggs; the others produce both eggs and living young. The eggs are very tenacious of life, and have been seen to hatch out after being thoroughly dried for more than a year; so it can easily be understood how pastures remain infected, ready to spread the disease, as soon as ever the weather is moist enough; and the heavy dews upon the hills supply this just as well as the low-lying swamps, as outbreaks on the Adelaide hills clearly show. Here again the danger of over-stocking and close feeding is evident.

As regards treatment, I prefer arsenic, as suggested in the case of blood worms, for this drug circulates rapidly in the blood and comes into direct contact with the immature worms in the lungs, killing them and weakening the adults, so that they are more easily got rid of. Personally I have never had better results from injections into the windpipe than from fumigation of the sheep, which latter is much more easily carried out on a large scale, and with fumes of cyllin or similar coal tar products is much safer.

Practically the remarks relating to sheep apply also to calves. The worm which most commonly affects the latter lives in the pipes, and produces both eggs and young.

Lung worm in the horse is much more rare than in other animals, but it is by no means uncommon.

The pig is very frequently affected with a variety peculiar to that animal, and the nodules formed by the walling-in of the worms is a very common sight in the slaughter-house.

There are still many parasites which I have not touched upon, such as those causing the nodules in beef in cattle coming down from the North, the so-called measles in beef and pork, which are the early stages of varieties of tape worm in man, and so on.

CONCLUSION.

I trust the sketches I have given of the careers of the more common ones will induce younger members of the Bureaux to take an interest in the wonders of their development, and in the inter-relationship between many of them and forms of disease whose origin is still obscure; while I hope I may have aroused among the older members an appreciation of the necessity of cleanly surroundings for stock, and the imminent risk of heavy loss they run by neglecting the destruction of such small things as worms and flies.

It is another application of the story of the loss of the shoenail which brought about the destruction of the city; of the wisdom of the preacher who said, "Take us the *little* foxes that destroy."

Recent researches have demonstrated that mosquitoes brought about the downfall of the mighty empire of Babylon, by harboring the germs of malaria that sapped the vitality of the nation. The Panama Canal, which will mean so much to Australia, could never have been cut if the life history of a gnat had not been studied and worked out.

REPLIES TO QUESTIONS.

In reply to questions, Mr. Place said that turpentine mixed with linseed oil or milk was excellent for worm troubles of any sort. Care should be taken, however, to see that it was thoroughly well mixed, and for this reason it was well when administering not to keep the vessel holding it still. He would thoroughly recommend the oiling of horses suffering from ticks. The oil would suffocate the ticks. Stockholm tar was an antiseptic dressing for wounds. It was one of the best dressings they could apply.

IDENTIFICATION OF PLANTS AND WEEDS.

Mr. J. M. Black gave an interesting description of various plants and weeds which had been sent by Branches for identification.

He stated that the following plants had been received from the Branches mentioned :—

MORCHARD. —(1) Darnel (*Lolium temulentum*), a grass which has a bad reputation, but which is only dangerous to stock if it becomes infested with ergot or other fungi. (2) The winter-flowering form of *Blennodia cardaminoides*, a small native, belonging to the family of the *Cruciferae*, and which turns its seed vessels down into the ground in the same manner as subterranean clover.

CLARENDON.—Fumitory (*Fumaria officinalis*), a weak, straggling plant of European origin, often called "Pinkie" in our southern districts, from the color of its small flowers.

BLYTH.—Dense-flowered fumitory (*Fumaria officinalis*, var. *densiflora*).

KINGSTON.—(1) *Anguillaria dioica*, a small bulbous plant of the lily family, known as "Bull's Eye" in some parts of South Australia. The accompanying letter says—"It is thought to be the cause of the death of many sheep, and it also makes them lose their wool when it does not cause death." I cannot find any previous record against this plant. (2) *Vittadinia australis*, a small strong-scented perennial of the composite family. "Made its appearance at Reedy Creek some years ago and is now spread over most of the dry land in the district." Both plants are native.

LYNDOCH.—*Ehrharta longiflora*, a South African grass which has been long domiciled in South Australia. A good fodder grass in moist situations.

WIRABARA.—A luxuriant specimen of nettle-leaved goosefoot (*Chenopodium murale*), a European weed which animals generally refuse to eat on account of its strong odor.

HAMMOND AND OTHER NORTHERN BUREAUX.—Salvation Jane, snake weed, or blue weed (*Echium plantagineum*), a Mediterranean weed which has spread rapidly over the State.

MOUNT REMARKABLE.—(1) Brown's dock (*Rumex Brownii*). (2) *Darlesia genistifolia*, a prickly native shrub with pea-shaped flowers. (2 and 3) *Erodium Botrys* and *E. cicutarium*, two species of "Wild Geranium," both introduced. (4) *Bulbine bulbosa*, a yellow-flowered native plant of the lily family, sometimes called "Wild Leek," and alleged to be poisonous; but Prof. Ewart states that the poisonous effect appears to be the result of a scouring action on animals. (5) *Plantago varia*, the native plantain or ribwort. (6) *Geranium pilosum*, the native geranium.

MOONTA.—Wild onion (*Asphodelus fistulosus*), a bulbous Mediterranean plant, proclaimed as a noxious weed. Does not appear to be poisonous, but does much harm in pastures and elsewhere, and can only be eradicated by deep cultivation.

STURT.—Spurred vetch (*Vicia calcarata*), a blue-flowered leguminous plant from North Africa, often found here in sandy soil. Of some use as fodder, but may become a weed in cultivation.

PINNAROO.—(1) *Stipa elegantissima*, a species of spear grass with beautiful feathery awns to the seeds. When young, the spear grasses afford good pasture; but when the awned seeds are ripe they are apt to be a nuisance to sheep and lambs. (2) *Bassia diacantha*, so called from the two short spines on the seed capsule. A form of saltbush or cotton-bush. (3) Narrow-leaved cress (*Lepidium ruderalis*), a cosmopolitan weed with small notched seed-pods, often found in crops and growing nearly as tall as the wheat. (3) Common vetch (*Vicia sativa*), an introduction from Europe, useful as fodder, but often troublesome in crops. (4) *Rhagodia spinescens*. The prostrate and spineless form of this little native plant. Has small red berries and belongs to the goosefoot family. It is probably quite harmless. (5) *Senecio lautus*, a yellow-flowered native groundsel. (6) *Senecio magnificus*, another species with larger and very showy yellow flowers. (6) *Gyrostemon cyclothea*, an ill-scented native shrub of the phytolacca family of no known value. (7) *Olearia rudis*, a native plant with a blue flower resembling a Michaelmas daisy, and probably protected from animals by its strong scent.

KINGSCOTE.—(1) Petty spurge (*Euphorbia Peplus*), a European weed, not poisonous, but of no use. (2) Probably *Rapistrum rugosum* (Giant Mustard or Turnip Weed), found growing amid Berseem clover, but too young for certain identification.

COORABIE, WEST COAST.—(1) *Eremophila subfloccosa*, a shrub hitherto supposed to belong to West Australia only. (2) *Rhagodia Billardieri*. (3) *Templetonia retusa*. (4) *Myoporum tuberculatum*. (5) Native tobacco. (*Nicotiana suaveolens*). All Australian plants of no known economic value. Native tobacco is slightly poisonous.

Mr. E. Davies, of Urania, Y.P., had sent a specimen of *Pimelea curviflora*, a small native shrub, stating that he believed horses and sheep had died from eating it. Several species of *Pimelea* have been accused of harboring poisonous properties, but this has never been proved.

Onopordon acaule (stemless Onopordon), which has been proclaimed as a noxious weed under the mistaken name of *Cirsium acaule* (stemless horse thistle), was forwarded by another Branch Bureau. A very prickly thistle, with downy-white leaves spreading on the ground, which has become a nuisance on the plains near Adelaide in many places and over a wide stretch of country near the Murray.

Several other specimens had been forwarded by other Bureaux in too immature a condition for identification.

Proceeding, Mr. Black said—When plants are forwarded to the Department of Agriculture, the questions most frequently asked are “Is this plant poisonous?” or “Is it good feed?” Both are often very difficult to answer. Take two very common weeds with a bad name, one South African, the other Australian—the Cape tulip and *Euphorbia Drummondii*. In 1908 Mr. J. F. McEachran, at that time Veterinary Inspector of Cattle, collected a lot of the two-leaved Cape tulip (*Homeria miniata*), which grows so thickly in parts of the Adelaide park lands, and tried its effects on some cattle. Two calves refused to eat the weed. An aged cow in poor condition died with symptoms of paralysis after being fed for three days principally on Cape tulip. The fourth animal experimented on was an old, dry cow, which at first developed symptoms of diarrhoea, but afterwards ate the weed in large quantities without any ill effects. Yet Cape tulip, especially the one-leaved species (*Homeria collina*), has long had a bad name in South Africa as poisonous to stock, especially to travelling bullocks, which are turned out hungry at the camping places and do not know the weed. It may possibly be that there is really no poison, properly so-called, in the Cape tulip, but that the deaths which have occurred here and in other countries are due to animals gorging themselves on the indigestible leaves and stems.

Something of this sort is believed to occur in cases where healthy young cattle are suddenly found dead in summer paddocks where the only green plant to be seen is *Euphorbia Drummondii*. Careful experiments were made with this little native plant in New South Wales as long ago as 1886. Fifty-six pounds of the weed were consumed by six sheep in six days without the slightest evidence of bad effects. Mr. Stanley, the Chief Veterinary Inspector, who conducted the experiments, calls it a “wholesome and nutritious herb.” He allows, however, that the plant, when eaten greedily by hungry animals, may cause fatal indigestion, in the same way as might occur after a surfeit of lucerne or wheat.

A few introduced plants, such as the apple of Sodom (*Solanum sodomæum*), the tobacco tree (*Nicotiana glauca*), and the thorn apple (*Datura stramonium*),

are really poisonous—that is to say, they exercise an internal chemical action which produces serious or fatal effects; but most of our alleged poison plants are probably dangerous by the acute indigestion which they cause in animals who have gorged themselves on the first green feed which came to hand.

Coming to the next question so often asked, as to whether a certain grass or other herb is good for grazing or for fodder, I would like to suggest that on this point the farmer can instruct the botanist rather than the botanist instruct the farmer. The man on the land has the opportunity of making a hundred useful observations on this subject, observations which cannot be made in towns or in gardens. It is not to be expected that there will be entire unanimity of opinion. I remember that, in 1909, a member of the Tatiara Bureau forwarded to the department specimens of the woolly star thistle (*Kentrophyllum lanatum*) with the statement that he had found it first-class feed for stock, especially sheep. Now I should have thought that nothing short of a camel or a donkey could derive any satisfaction from eating this fearfully prickly plant, and I presume it is only when young that it can be eaten at all. If members of the Branch Bureaux would collect and put on paper their personal experiences as to the effect of both native and introduced plants on animals which eat them, and on the preference shown for certain plants, they would be doing an excellent work, and assembling a store of knowledge which could afterwards be consolidated and published as a whole. Where there is any doubt as to the identity of the plants on which observations are made, flowering specimens should be sent to the Department of Agriculture for identification.

A USEFUL GRASS.

I would like to draw attention to a grass which appears very promising in many of our districts, and of which several farmers have spoken well in the Pinnaroo district and the South-East. This is the many-flowered millet grass (*Oryzopsis miliacea*), a perennial Mediterranean grass, which also propagates itself very rapidly by seed. The *Oryzopsis* grows in very dry country in the Mediterranean region, and I think it well worth a trial in most parts of South Australia. I would also like to warn farmers against an insidious weed which has appeared in South Australia during the past five or six years, and which is spreading rapidly. Its English name is Lesser Bindweed (*Convolvulus arvensis*), and it bears much resemblance to some forms of our native *Convolvulus erubescens*. Both have the same pretty pink funnel-shaped flowers, but the European weed is aggressive, and when it once enters cultivated ground is very difficult to get rid of.

NOXIOUS WEEDS.

The Chairman--A resolution has been sent to the Advisory Board asking that an expression of opinion from this Congress should be taken as to whether the tobacco tree should be proclaimed a noxious weed.

A vote was taken on the question, with the result that Congress declared in favor of having it so proclaimed. By a further vote Congress affirmed that horehound should not be proclaimed a noxious weed.

Mr. H. H. Davie (Mount Remarkable) moved--"That this Congress is of opinion that the present administration of the Noxious Weeds Act is quite ineffective, and that the Government be asked to legislate with a view to taking over the administration of the Act and administering it by officers not resident locally." The reason for the resolution was evident to many. His Branch, in bringing the question forward, had no desire to in any way reflect on the district councils, but they felt that the matter was an exceedingly difficult one for the councils to deal with. In some cases some of the most important members of district councils were the greatest sinners as regards the non-destruction of noxious weeds. The clerks of the councils were the administrative officers, and it could well be imagined that if an influential member of a council received a notice to destroy the weeds he might make it very unpleasant for the officer concerned.

Mr. T. L. Truman (Tatiara) seconded the resolution. His Branch had found the Act unworkable.

Mr. McCallum (Willowie) opposed the motion. The Government were the greatest sinners. In places land belonging to the Government was covered with noxious weeds. Star thistle was the worst pest in his district, and the district council had spent a great deal of money in trying to eradicate it. Some of the land was so overrun with the star thistle that he did not think it would ever be eradicated.

Mr. Nicholls said that the Advisory Board had appointed a sub-committee to inquire into the question of the destruction of noxious weeds. Professor Perkins had gone through all the Acts dealing with the question, and as a result the Advisory Board had come to the conclusion that there was ample power given to compel the destruction of noxious weeds, provided action was taken under the Act of 1862, which had never been repealed. Unfortunately, however, the district councils had proceeded under the District Councils Act, and that Act contained a provision that the councils must first clear their own land. That provision, however, was not in the Act of 1862. The Board had recommended the Government to place the control of noxious weeds under the Minister of Agriculture, and the question was referred to Cabinet; but, presumably, because the Government considered that the request should come from the local bodies concerned themselves, nothing had come of it. The point he wished to emphasize, however, was that the district councils should prosecute under the Act of 1862, which did not contain the provision which in their own Act was a stumbling block.

Mr. McEwin (Blyth) considered the question too important to be decided that morning. He took it for granted that the Noxious Weeds Act was not being administered, but would like to know how much harm resulted through its non-administration. So far as the Scotch thistle was concerned, it could be destroyed easily by cultivation. He opposed the motion. They had enough Government officers worrying them already. Did members of Congress know that there was one Government man out of every 11 men in the country?

The motion was lost by a large majority.

STUBBLE AND SCRUB BURNING.

Mr. A. Ramsey (Utera Plains) moved—"That district councils be empowered to fix the dates as well as hours for burning stubble and scrub in their respective districts." The objective was to place in the hands of the councils power to prevent the burning of scrub until a later date than now allowed in those districts where burning so early in the season was dangerous. Such legislation would also enable the district councils to prohibit the burning of stubble which, under existing regulations, might be burned between certain hours during any month of the year.

Mr. Nicholls (Secretary Advisory Board) stated that at present district councils had no power to alter the dates on which scrub might be burnt. It was felt that the councils should have power to prohibit the burning of stubble in their respective districts when that course was deemed necessary, and they should be empowered to prohibit the burning of scrub during the early part of February.

Mr. D. B. Butler (Butler) drew attention to the fact that in his district persons were burning scrub, &c., during the time they had crops standing in the paddocks.

Mr. C. Ricks (Cherry Gardens) considered that the Bush Fires Act should be amended to allow of the burning of scrub in the hills districts in November, February, March, or April during night or day. The present Act prevented their lighting firebreaks during the months of November, December, January, and February. They wished to burn their scrub in November. If they had been allowed to light firebreaks during last November, no doubt a great deal of the damage done by the bush fires would have been obviated. The district councils knew the local conditions, and should, therefore, be in a better position to fix the time for the burning of scrub and stubble.

The motion was carried unanimously.

EVENING SESSION.

Mr. G. F. Cleland, a member of the Advisory Board, presided.

DUTY ON IMPORTED SUPERPHOSPHATE.

Mr. F. Coleman (Saddleworth) said that he had been asked to move the following resolution:—"That this Congress of the Agricultural Bureau is strongly opposed to any duty on imported superphosphate, and requests

the Advisory Board to take such action as may be necessary make this to protest effective." The question had been referred to the various Branches, and over 20 replies had been received, each of which was strongly opposed to the proposed duty. The Saddleworth Branch was not in any particular way identified with the matter, but it had been thought that it would be well for Congress to have an opportunity of considering it. The question of imposing a duty on imported superphosphates had, he understood, been seriously considered by the late Government. The proposal, he understood, was that the duty should be 10s. per ton. The quantity imported into the Commonwealth in 1910 was 225,000 tons, and the quantity distributed over the land was between 300,000 tons and 350,000 tons, consequently an increase of 10s. per ton in the price would practically mean a tax of £150,000, which would come direct from the primary producers, as it was a tax which could not be passed on. At the recent Conference at Lameroo the general impression had been that it would be beneficial to the farmers if they used more superphosphates. Probably the reason why such comparatively small dressings were now used was because of the expense, and if that were added to the probability was that less instead of more would be used. So far as he knew, there was not a country in the world where duty had to be paid on fertilisers. A certain amount of superphosphate was imported, and it had been said that it was dumped here. He had, however, been told that that was not so. The reason why that particular phosphate was largely used was because it was a very good phosphate. The imposition of a duty on superphosphates would be a serious mistake. Already, owing to the rise in wages and the increased cost of living, it was costing the farmers decidedly more to grow a bushel of wheat than it did formerly.

Mr. W. Roennfeldt (Greenock) seconded the motion, which was carried unanimously.

THE FRUIT-GROWING INDUSTRY: ITS POSITION AND PROSPECTS.

Mr. Geo. Quinn (Chief Horticulturist) contributed the following address on "The Fruit-growing Industry: Its Position and Prospects":—

Anything partaking of the nature of a review of the progress of fruit-growing in South Australia would involve a careful scrutiny of the progress of the State as a whole. In this respect no great departure is made from the rise of this particular form of production in all newer countries of the world. In our case the pioneers brought with them the seeds or plants of the kinds of fruit familiar in their home countries, and in a few instances others—chiefly men of travel who had visited warmer climes—went farther afield in search of the products of those parts of Europe and Asia wherein the climatic and soil conditions were deemed to most closely approximate to those they found, or expected to find, beneath the Southern Cross. For a good many years after the foundation of the State, and while there were

yet no aggregations of population in cities, fruit-growing was confined almost entirely to the raising of supplies for domestic purposes. The discoveries of copper mines in various centres, with the consequent concentration of population—not directly providing its own food—gave an early stimulus to the commercial production of fruit and other garden crops. Later on came the opening up for wheat-growing of those parts of the Northern Areas over which the restricted rainfall made the growing of fruit by the farmers and township dwellers almost impossible. Meanwhile the increase of city and suburban population gave a further impetus to fruit-raising, and in the middle distance of our history as a province the fame of Adelaide-grown grapes had established a water-borne trade with Victoria, and a little later with New Zealand.

Although practically all the needs of the Victorian trade in fresh grapes have been for some years self-supplied, during the season one may yet see a reflection of this fame in the tickets displayed in the Melbourne fruit shops bearing the delusive legend "Choice Adelaide Grapes." (Laughter.) The sudden rise of the Barrier mining fields in the eighties came as a boon to the struggling fruitgrower, and this market has increased in value until last season the exports of South Australian grown fruits forwarded to Broken Hill exceeded 82,000bush.

MURRAY RIVER SETTLEMENTS.

Another of the most remarkable awakenings that this industry has received came with the advent of the Murray River irrigation colonies, established through the energy of the Chaffey Brothers. It is at the present day interesting to recall how the proposals of these enterprising Americans were viewed with incredulous pity by the older order of fruitgrowers, who charitably gave them an opportunity which it was generally considered could only end in disaster. It is quite true the Chaffey failed; but in their settlements they gave this State, and in fact all Australia, the finest object lesson in intense fruit culture yet received from any source. (Applause.) As an outcome of the recognition of the community of interests possessed and realised by the fruitgrowers in the Chaffey settlements another object lesson has been afforded, which I venture to predict shall have a wider influence on the welfare of those engaged in fruit-growing in the State than any other event which has transpired in its history. I allude to the co-operative effort, which has not only resulted in the primary producer having a voice in the fixing of the price of his products, but has regulated as well the general standard of the quality of such produce.

Fruit-growing before it becomes raised to the status of a staple industry has awaited in all countries upon the aggregation of population, either at home or near by, to provide the necessary consuming power. Usually it is one of the heralds of closer and intense settlement upon a country's lands,

With perhaps the exception afforded by Tasmania, in Australia it has followed slowly in the wake of agricultural and mining developments, which have been in turn preceded by the pastoral occupation.

THE APPLE EXPORT TRADE.

Following closely upon the good foundation given to the dried fruit industry by the Murray River irrigation colonies, probably the next best prominent milestone on the road to progress was the awakened activity given the industry by the Agricultural Bureau in the earlier years of its establishment. Through the determined advocacy of the late General Secretary, well supported by the late Mr. Thomas Hardy and other earlier members of the organisation, the business of fruit-growing took a fresh lease of life. (Applause.) The planting of apples for export was widely advocated, and the campaign against insect and fungus pests of the orchard organised upon modern scientific lines, some legal steps being taken to enforce attention to the neglected trees.

Coming closely in the wake of these efforts of the Agricultural Bureau, and as a natural corollary thereto, was the inauguration by the Government Produce Depot of the regular export trade to Europe in apples, and to a lesser degree in pears, grapes, and oranges.

Beginning in 1896 with a modest 647 cases, this trade has, with fluctuations due to irregular yields, increased in 15 years to a total of 187,701 cases last season (1911-12). Taken on the very modest basis of a value of 7s. 6d. per case, this represents a money value of £70,000.

THE FRUIT YIELD.

Arrived at the stage of its present position, your indulgence is sought whilst I quote a few figures in describing the same. The statistical records for 1911-12 show that for commercial purposes 23,214 acres are devoted to fruit trees, 1,850 acres to grape vines for fruit for table uses, and 7,406 acres of vines for drying into currants and raisins. To make these figures more expressive of the meaning contained in them, I wish to go into a few details. Calculating 100 trees per acre as a conservative basis, we possess of—

	£	s.	d.
Almonds, 2,625 acres, yielding 282 tons of nuts worth at 6d. lb.	15,766	16	0
Apricots, 2,422 acres, 165,982bush., at 2s. 6d. bush.	20,747	15	0
Apples, 9,550 acres, 583,860bush. at 2s. 6d. bush.	72,985	0	0
Cherries, 870 acres, 42,607bush. at 4s. bush.	8,521	10	0
Pears, 1,450 acres, 81,644bush. at 3s. 4d. bush.	13,607	6	8
Plums, 1,573 acres, 106,758bush. at 2s. bush.	10,875	8	0
Oranges, 2,246 acres, 220,988bush. at 5s. bush.	55,247	0	0
Lemons, 517 acres, 47,176bush. at 2s. bush.	4,717	6	0
Peaches and nectarines, 1,872 acres, 80,315bush. at 4s. bush. .	16,063	0	0
Unspecified, 373 acres, 5,533bush. at 2s. bush.	553	3	0
Bush and berry, 579 acres, 13,338bush., at 6s. 8d. bush.	4,444	13	4
Currants (dried), 2,334 tons 15cwts., at £37 6s. 8d. per ton (calculated at 4d. per lb.)	87,164	0	0
Sultanas (dried), 737 tons 3cwts., at £46 13s. 4d. per ton (or 5d. per lb.	34,400	6	8
(Gordo and Lexias, 995 tons 8cwts., at £28 per ton (or 3d. per lb.)	27,871	4	0
Grand total	£372,764	8	8

Of the 24,077 acres as calculated above, 6,816 acres are reported as not yet in bearing. This leaves 17,261 acres of fruits other than grapes, yielding a value of £223,328 18s., or an average return of not quite £13 per acre based on the above estimated values, in respect to which I invite criticism. It may be mentioned, in passing, that the Government Statist, who takes a more liberal view of the values, estimates those of orchard and market garden crops at £376,915, and as the value of market garden crops is stated to be £95,434 during 1911-12, the orchard revenues, when added to the value of the dried fruits of the grape vine quoted above, would make a total of £430,916 10s. 8d. for the last season's operations in the production of fresh and dried fruits.

THE OUTLOOK.

The above figures convey something of an approximate idea of the position of the fruit-growing industry. And now what of its prospects?

It is when we begin to face this question squarely we realise that no longer are we an isolated province, but a unit in a great Commonwealth, and our vision must in many respects compel us to take even a wider view and become fully seized of the fact that we are rapidly assuming the position of one of many of the competitors of the world's markets. If I can read their thoughts, in the planting operations of those whose actions are worthy of consideration. the indications are as follows :—

There is a steady, shall I say somewhat slackened, pace in the planting of apples, and more particularly pears, for export purposes. Plums, with the exception of drying prunes, are not being set out at all. There are moderate plantings of peaches, chiefly of the varieties suited to drying and canning. The area under apricots is almost stationary. Almonds are being planted somewhat freely. Lemon trees are not only not increasing in number, but are becoming neglected in the present plantations, or being grafted over to oranges. The planting of oranges of the Washington Navel variety has made nursery stock of this sort practically unprocureable. Pears of the William's Bon Chretien variety for drying and canning are receiving moderate attention. The fig, owing to its coming into favor with the jam-maker, has begun to creep more into prominence of late. Nectarines which have never been abundant are practically not increasing.

RAISINS AND CURRANTS.

Turning to those grape vines, the fruit of which is used for food, planters are cautious. The Gordo Blanco, from which the ordinary *lexia* or pudding raisin is made, has long since been produced beyond the requirements of the Commonwealth, and the shipments made thus far to London are never described as being sold at "Dumping prices"—that term is relegated to the over-stimulated products of other countries which may be sent to us. The present value placed upon this grape may be estimated from the experience

of the writer who, at mid-season this winter, failed to secure 300 rooted plants from the local nurseries. Fortunately the stimulus given to the distillation of brandy has come almost in the guise of a charity visitor to the growers of Gordos.

Since about a decade ago, when Mr. W. C. Grasby brought prominently before our growers of Zante currants the advantages secured in the shape of increased yields in Greece by cincturing the stem of this vine, and the Commonwealth Government followed closely by placing a prohibitive duty upon the European grown fruit, the increase in production has gone up by leaps and bounds in this State, which has thus far produced more than half the currants grown in Australia. This frenzied haste to get rich out of currants has now given place to a feeling of uncertainty respecting what shall happen when (as it must inevitably) within the next few seasons, probably three or four, the production exceeds the consumption within the bounds of the Commonwealth. Personally, I think this spirit of caution is a wise one, for without something wholly unexpected happens we have no hope of taking the dried produce off our currant vines to Europe. I am not altogether pessimistic respecting the chances of the currant-grower, and hope no one will ridicule the suggestion that sometimes supply creates demand, which is, perhaps, a reversal of the hard and fast rule universally accepted in general economics.

The other seedless grape, the Sultana, if gauged on the basis of the present needs of the Commonwealth has yet a little time to exist and yield a profit. In respect to this fruit there is a faint hope that we may yet obtain a place in the world's markets; but this, in my humble opinion, will depend largely upon our own efforts in the direction of producing an article which is not beaten in quality by the old world centres of production.

APPLES, ORANGES, ETC.

Returning to the other fruits quoted, I am of the opinion that with the widened outlook we are not now much nearer to over-production in apples than we were 20 years ago, although the price for our produce has receded. This fruit is universally used by the rapidly increasing white races, and nothing supplants it. In regard to pears, our canned produce is equal in value to that of any country in the world, and yet is capable of much improvement by better methods of manipulation.

Prunes we yet import in large quantities. All of our dried figs worthy of the name are brought from Southern Europe, and yet every kind of fig, including the fig of commerce, thrives in this climate in a manner difficult to excel. The same may be claimed for the almond, which is as yet largely imported into the Commonwealth.

The Washington Navel orange grown along the banks of the Murray has been declared by competent authorities in London to be "the finest orange

that has ever entered Covent Garden market." (Applause.) This reputation is borne out by its inherent natural qualities—a fact fully recognised by dealers in the adjoining States, as may be noted from the shop and market values placed upon them in the eastern capitals. I have been informed by those who have been commercially interested in the shipping of this orange to London, that it is not a paying proposition. The reason advanced being, that "A loss of between 15 per cent. and 20 per cent. must be reckoned on for depreciation through decay in transit. For those landed in good order the price obtained has been remunerative, but the risk of decay on the voyage had been too great."

Accepting these statements as facts, I am of the opinion the exportation of this orange is on a parallel basis with that of the apple less than 20 years ago. The solution of the difficulty rests with the careful and consistent exercise of human intelligence and ingenuity in the handling and transport of the product from the orchard to the market. Although the opinion may be disputed, I believe that this orange in Australia, as it has in California, will practically displace all of the more prominent common types of oranges, and to do this they must be produced cheaper and in greatly increased quantities.

THE NEED FOR CO-OPERATION.

Regarding the position from a State, Commonwealth, and oversea point of view, I venture to assert that the prospects for good or ill in respect to this industry are largely in the hands of our people themselves. There are problems in production which must be met and overcome, but the problems crying most loudly for solution at the present moment are mainly connected with the manipulation and marketing of the produce of our orchards.

At a recent meeting of one of the Branches of this Bureau in a fruit-growing district a member very pertinently said, "You have given us some useful information regarding the growing of fruit, but what troubles us just now is how to sell it to better advantage." That sums up the present position in a nutshell and reveals the unsatisfactory side of the industry.

I beg you will allow me to face this question in some phases as it appeals to me. I know something of the struggles and disabilities under which the primary producers labor. In my mind it has always rankled as one of the most unmitigated injustices humanity tolerates that the men who feed the community should have as yet had little or no voice in fixing the price they shall receive for the results of their labor. The crying need for the man on the land is organisation. (Applause.)

Let them recognise the community of interest which naturally binds them together. Let the fruitgrowers be fully seized of the fact that genuine reforms do not come from those who have profits to lose by their consumption. The fruitgrowers must work out their own industrial salvation.

I know these opinions may be discounted as so much theoretical cant, coming from a publicly paid official, but projects seemingly of an infinitely less likely character have crystallised into actual working factors in our midst within recent years. Who would have dared, 25 or 30 years ago, to say that such a motley heterogeneous class of men as Australian shearers and bushworkers could have been organised into a sufficiently cohesive body as to practically dictate terms to such an immense and widely influential interest as the pastoral industry.

The fruitgrower must begin to reform his industry as all other adherents to any fixed reform have done by sinking certain immediate personal advantages to enable the good of the whole body of fruitgrowers to be realised. In other words, the advantages and disadvantages must be pooled to enable the former to be magnified and the latter to be more readily overcome. No system of co-operation has been achieved without struggle and sacrifice, and one cannot hope that the case of the fruitgrower will prove an exception. Personally, I see no possible chance of the fruitgrower obtaining permanently a fair share of the results of his labor without he becomes embodied into the closest and most far-reaching co-operation.

The producers of dried fruits are not only in this, but in the adjoining States, being gradually drawn together with results of a gratifying nature to their industry in the shape of regulating the price and standardising the quality of their produce. Theirs, it will be claimed, is an industry which has developed under the shelter of a tariff wall, but that cannot discount the value of the organisation built up; and when the time comes to meet the crisis which a home tariff cannot altogether surmount, the lessons in association learnt will prove a tremendous factor in overcoming the difficulty. Let us not forget that it is only by constant vigilance any industry can be maintained on a satisfactory basis. In the question of oversea export there is need for fruitgrowers, not alone in this State, but throughout the Commonwealth, to unite to influence and understand each other, to counsel Governments, and to approach merchants, shipowners, and other bodies who, though necessary to the well-being of this industry, are ever on the alert to take advantage of their disunion to absorb the lion's share of the value of what the fruitgrower raises. I repudiate any idea of setting one section of the industrial community against another section—that has been brought already into existence by the stress of the trade—but to secure fair play the competitors must stand on equal terms.

In the export trade the standardisation of the fruit in variety, maturity, grading, packing, and general condition is a crying need, and this cannot be accomplished without organisation, and I may say such organisation should not be confined to this State alone. The time is passed for parochialism for this trade whose federalism has outstripped the boundaries of politics.

A STRIKING ANOMALY.

In matters of purely local trade it is only by organisation that a better system of distribution of our orchard products can be achieved. There is much radically wrong with a system which allows tons of the best plums—equal to the finest the world produces—to rot upon the ground because the grower cannot obtain more than 1s. per bushel for them, when at the same time in our Northern townships and on the farms within a couple of hundreds of miles such fruit costs the consumer 3d. per pound. (Applause.) It is a pertinent question to ask for the reasons why, in our Northern Areas, the storekeepers stock their shelves with Tasmanian jams made in some instances from kinds of fruits which that State does not produce or produces very scantily, and which in this State grows so abundantly that the grower cannot obtain a payable price for them.

A BEGINNING IN ORGANISATION.

In one district a start has been made over a few seasons to pack and export apples on a co-operative basis under a district brand. The Commerce Act examiner will tell you that these lines give no trouble to him, because from one end of the season to the other they are uniform in grade and packing. In a suburban locality a co-operative jam and fruit-preserving factory has made its appearance. Let me ask fruitgrowers in all seriousness to give it support, and if it is not properly conducted lend a hand to overcome the difficulty. Get all those country storekeepers who stock jams from outside sources to become shareholders with you and thus secure their keenest interest in pushing your goods at the smallest margin of expenditure on middlemen. In conclusion, I wish to emphasize the statement that the only hope for the fruitgrower lies in the co-operative distribution of his produce, whether in a fresh, dried, or preserved condition. (Applause.)

THE DISCUSSION.

Mr. W. H. Waters (Renmark) said that Mr Quinn had stated that the output of dried sultanas was 737 tons last season. He thought that Renmark alone produced that amount.

Mr. Quinn—That is the output from Renmark. There is very little produced anywhere else.

Mr. Waters asked if Mr. Quinn did not think if the packers wore gloves when packing for export that oranges would carry well and keep well after arriving at their destination. He had exported oranges for the last four seasons, and not only had they arrived in absolutely tip-top condition, but had kept for months. He put that down entirely to careful handling.

Mr. Smith (Angaston) said that over-production as regarded currants and sultanas had already been reached. He would like to know if Mr. Quinn knew any cure for die-back in apples and Duchess pears. He knew a piece of

black level soil at Angaston which had been planted with apples, but in four or five years the trees had died. It was replanted with pear trees, but these had also died.

Mr. Quinn said he entirely agreed with Mr. Waters as to the necessity for great care in handling oranges intended for export. Up to the present that necessity had not been recognised by some growers. He was obliged to Mr. Smith for the information regarding currants and sultanas. He happened to know the piece of land at Angaston to which Mr. Smith had referred, and from its outward appearance did not think it was deficient in nitrogen. It seemed as if the soil contained something not suited to apples and pears.

Mr. Ricks (Cherry Gardens) said one difficulty fruitgrowers had to contend with was the fact that they did not get proper carriage on the railways.

Mr. J. J. Cormack (Amyton) supported Mr. Quinn's proposal that the fruitgrowers should form themselves into co-operative bodies.

Mr. Laffer said that there was no need to make any complaint in regard to the carriage of fruit on the railways so far as this State was concerned. He thought the railway officials helped the fruitgrowers in every possible way. Louvre trucks were not necessary when fruit was carried only a short journey, but they were necessary for long journeys, and the Government had provided quite a number of those trucks for the carriage of fruit and vegetable produce.

Mr. Salter (Angaston) agreed with Mr. Quinn's views in regard to the need for co-operation among fruitgrowers, but it was extremely difficult to bring that about. One difficulty was to get them to hold together as regarded prices. However, he believed that had been brought about in America, and it would have to come in South Australia.

Mr. Jackson (Kingston) asked what was the cause of shothole in apricots.

Mr. Kimber (Northfield) said that an organisation known as the Fruit-growers' and Market Gardeners' Association was being formed near the city, and now had 500 members. He therefore thought there was a chance of an agreement being arrived at as to the prices of fruit. Mr. Quinn had referred to the Co-operative Jam Factory, and he was glad to be able to say that that factory had been so successful in the first year of its existence that tenders were now being called for its enlargement.

Mr. Arundel (Greenock) asked if grapes grown in the Barossa district were of as good quality as those in the hills near Adelaide.

Mr. Quinn said shothole might be caused by one of several fungi. It was a disease which could be prevented to a great extent. The remedy was to spray the trees with Bordeaux mixture just when the color of the flower was commencing to show. With regard to the richness of grapes in the Barossa district as compared with those grown on the Adelaide plains he could hardly speak; but as a rule the grapes on the Adelaide plains were

grown in richer and better soil than those in the Barossa district. The tendency, therefore, was that they made a more attractive table grape, but very possibly the grapes grown at Barossa would be richer in saccharine.

A visitor desired to know whether spraying with arsenate of lead would result in the destruction of curculio beetle.

Mr. Quinn replied that in one case where nursery stocks were heavily covered with arsenate of lead the beetle disappeared; but in the case of experiments carried out in the South-East, spraying was found to be ineffective.

Mr. Cleland (Advisory Board) pointed out that fowls would get rid of the beetle.

PROBLEMS CONNECTED WITH THE SHIPMENT OF FRESH FRUIT TO OVERSEA MARKETS.

Mr. G. R. Laffer (Vice-Chairman of the Advisory Board) read the following paper on the above subject:—

In dealing with the matter under consideration, one is impressed with the fact that production of fruit has increased enormously during the last few years, and it can be said with safety that the industry has reached such large dimensions that it is imperative that a large proportion of what is grown must be exported, as the quantity produced is far in excess of what is required for local consumption.

In Australia our season of production is the very opposite of those countries in the Northern Hemisphere, and although cool storage has done much to extend the season in which fruits can be held in condition, there seems to be a limit to the time in which it can be stored and sold at a profit; consequently we find a short season in the spring of those countries when the supplies of local stored fruit becomes depleted, and they have to look elsewhere for supplies. That season is only a short one of about two and a half months, and this is the period for which fruitgrowers in Australia have set themselves the task to supply the requirements of those markets. With that end in view, very large areas of land have been planted with those varieties of apples and pears which experience has proved to be most suitable for the requirements of European and other markets. As fruit trees begin to produce profitable crops at five years after planting, it will be seen that it is a matter of the very greatest importance to those engaged in the industry, and also to the welfare of the several States in the southern portion of Australia where fruitgrowing plays such an important part in the settlement and development of the country, that the markets of the world where Australian fruit can be profitably absorbed should be fostered and organised to their very fullest extent. Not only are we faced with the fact that many young orchards are coming into bearing, and the number is likely to increase very much during the next few years, but it is also safe to say that orchards are now much more productive than they were a few years ago. Owing to

the complete success of arsenate of lead as a spray, the loss through wormy fruit is now not often more than 5 per cent. where previously it was from 40 per cent. to 60 per cent., so that not only are the trees more profitable, but the area has increased very much.

FRUIT PRODUCTION.

That the industry should receive every assistance in overcoming the difficulties with which it has to contend by the Governments of both State and Commonwealth I am sure will be conceded by all. (Applause.) Fruit-growing is essentially a closer settlement industry, and employs a larger proportion of labor on a given area than any other rural industry; it occupies areas of land which in many respects would be of little use for other industries, and provides men of limited capital with a means for providing homes for themselves and their families in humble content and happiness. It was estimated three years ago that orchards and gardens in this State raised produce worth over £700,000 for that year. That fruit grows to a great degree of perfection in this State I am sure will be readily conceded, and if, with the very limited areas now under cultivation, fruit and other products can be produced worth nearly three-quarters of a million pounds in a year, one is impressed with the enormous possibilities of the extension of the fruit areas. To me it seems there is scarcely any limit to our production in this respect; but we are faced with the fact that there are limits to profitable markets for our produce.

That the State Government has done a great deal for the industry must be admitted, and a great deal more would be done if the growers would only combine and organise in their own interest, and I maintain that sooner or later they will be forced to do so. Many of the difficulties which now beset the industry would be overcome if the growers would only be true to themselves.

VALUABLE GOVERNMENT ASSISTANCE.

Growers in this State have at their disposal the splendid facilities of the Produce Export Department at Port Adelaide, where fruit is received and pre-cooled before shipment at a very nominal charge when one considers the services given. In addition to this, the Government have provided, for the purpose of looking after producers' interest in London, the Trade Commissioner (Major Norton), who personally supervises the disposal of every consignment of produce sent to him. Yet I have no hesitation in saying that it is to the fruitgrowers' discredit that his services have not been more fully used in connection with the disposal of South Australian fruit on the European markets. That all growers and shippers indirectly gain by the Trade Commissioner's presence in London I fully realise, as his very presence there has had a general toning up in the handling and disposal of South Australian fruit.

To me there seems several distinct reasons why the Trade Commissioner's services are not more fully availed of. The first is to be found in the fact that the Produce Department do not canvass for business, but simply do the work for those who choose to come and ask them to do so. Secondly, there is some feeling among growers that they cannot rely upon the Produce Department being able to obtain the necessary space, particularly in early or favorite boats.

THE SPACE DIFFICULTY.

Thirdly, the fact that certain firms who act as agents for steamers carrying fruit are also produce agents, and canvass for business and have the allotment of space within their hands, has certainly not tended towards the independence of the grower, who, in many cases, feel that they have a better chance in having the space requirements allotted if they ship through these firms.

Under the present system, where specking space is allowed by private firms, the Produce Department or any shipper putting in applications for actual space required is likely to find themselves with a *pro ratio* allotment, which may be one-third, or even less, of actual requirements. So that if it can be urged against the Produce Department that growers are not sure of getting their space requirements allotted if they propose to ship through them, it is surely due to the faulty system prevailing by shipping companies allowing private firms to speck the space.

It was rumored last year that one firm in Adelaide applied for space for about 180,000 cases, and only shipped a little over 20,000 cases. That firm had not a possible chance of controlling 180,000 cases, as the full export for the State was only about that quantity; but coming in on a *pro ratio* basis they got control of a large quantity of space, and consequently growers had to go to them for their requirements, and the fruit was handled by that firm's representative in London. This is an exceptionally large application, but the system is that which is adopted by most agents.

Shipping companies should not allow agents to control the space until they have given growers every opportunity of taking it up. They should recognise their responsibility to growers of produce for whose custom they are catering, and, therefore, should demand some evidence that applicants are accredited agents for certain growers who have certain quantities to ship.

Tasmania being off the regular route of steamers, shippers there have protected themselves by making forward contracts for space, and thus we are all forced into the early taking up of space, *i.e.*, applications have to be made in October and November for fruit which will not be shipped until March and April. It is questionable if there is any necessity for this now, although it may have been necessary in the early days of the trade. Fruit is carried by regular lines of steamers. The boats come to Australia. They would in any circumstances pick up the fruit. Therefore, no reason can

be seen why shipping companies should require any more lengthy application for space for fruit than they demand for butter, shipments of which from South Australia are arranged not earlier than 17 days before date of shipment. The fruit business should not be any harder to arrange than the butter.

Even after growers have made application for space and have had it allotted to them by shipping companies, the space has not always been available when the boats have reached this State. This difficulty was prominent the season before last, when growers who had entered into definite space agreements found when the boats reached Port Adelaide that their space had been filled in the other States, and the fruit which they had provided ready packed for shipment was thrown back upon their hands. This was particularly the case in some of the early boats, and created a block at port practically right through the season, and eventually resulted in heavy loss to shippers. This is distinctly unfair, as, having entered into definite contracts, had the fruit not been forthcoming shipping companies would have looked to growers to pay dead freight.

THE CARRIAGE OF FRUIT.

One of the most unsatisfactory aspects in the export trade is the very unsatisfactory condition in which much fruit reaches its destination. While I am not going to say that the shipping companies officers are entirely responsible for this, still there has been, on many occasions, very distinct evidence that proper temperatures on the voyage home have not been maintained. This is very important, apart from the question of condition. It has been proved conclusively that bitter pit, a disease affecting some varieties of apples, is practically developed on the voyage home by fluctuations in temperature. Condition is really the governing factor in the successful development or otherwise in the shipment of fruit to oversea markets, so that growers have a right to demand that as they pay a high rate of freight for cool storage on the journey to London and elsewhere every care should be taken to ensure that the cargoes should be landed in good condition. Not only does bad condition mean lower prices for the particular shipment involved, but it certainly has a depressing effect upon the shipments that follow.

One of the most important points to be considered in the export trade of fresh fruit is certainly "temperatures." There seems very distinct evidence that much of the fruit is carried on the voyage at too high a temperature. I believe the regulation is now about 36 degrees to 40 degrees, while all experience seems to prove that for apples 33 degrees to 35 degrees is right; and for pears, 31 degrees to 33 degrees; and in connection with temperatures, it is very necessary to have proper air circulation.

PRE-COOLING.

It is also very important to consider the question of the temperatures of fruit when received by the steamers. Personally, I am a strong advocate that all fruit should be pre-cooled before being placed in the ship's chambers. If that were done, even temperatures could be much more easily maintained on the voyage home, and faults in condition could be placed upon the shoulders of those responsible for the defect. If the temperatures were watched and maintained on the voyage we should hear very few complaints of bad condition from the European markets.

NECESSITY FOR ORGANISATION.

As the export of fruit from Australia has passed the experimental stage and has now become a matter of trade and commerce, surely it should be the aim of those engaged in the industry to foster and organise it to its very fullest extent. I know that it has always been a most difficult task to get producers to combine, even in their own interest; but wherever it has been done on proper lines it has been greatly to their own benefit. Often the grower is not a good business man, and may have an exalted opinion of the quality of what he produces, and makes his own grades, which may be right or wrong, or thinks his brand becomes known on the London markets, and that he gets better results than his neighbour. All this may be true in some instances; but if the trade is going to expand and take its proper place as a commercial enterprise, all this has to be knocked out. The multiplicity of brands and grades is the curse of the fruit business. Standardisation of grades and brands begets the confidence of the buyer. Experience teaches that it is ever easier to sell large quantities of standard grades, and to be able to repeat orders of the same grades and qualities as the different boats reach the market, than it is small parcels from different shippers of promiscuous grades and qualities. When growers begin to realise this truth and to act upon it the trade will become more satisfactory and profitable.

THE FIRST ESSENTIALS.

The very first essential will be the establishment of packing-houses in positions centrally situated to the producing areas where all the produce from a district will be merged and packed in uniformity. Growers should also realise that it costs as much to pack and export inferior fruit as it does the best quality, and that the former, in addition, has a depreciating effect upon the market, so that nothing inferior in quality or less than 2½ in. should be sent. Whichever State adopts these precautions and methods will, to a very large extent, create confidence and capture the most beneficial trade and will put much extra money in their own pockets. At present much fruit, not sufficiently mature, is being sent early in the season. The same complaints come back every year. The inspector should have power to reject fruit with this defect.

SOUTH AFRICAN COMPETITION.

We in Australia must realise that we have a very serious competitor in South Africa. Victorian nurserymen were very fond of boasting about the quantity of trees they sent to South Africa ; but we have come to the stage when growers here must realise that those trees are beginning to produce their crops and are now increasing. Reports recently received show that the Government there are assisting the growers by engaging their space requirements. Their freight is much less than from Australia, the voyage being only about half as long, and being nearer the world's markets they can send soft fruits with comparative safety.

The natural disadvantages in Australia are great. We are farther from the world's markets than any other country producing similar commodities ; consequently the journey home is longer and more expensive. We have, in addition, to pay higher wages and work shorter hours. With these disabilities, therefore, we cannot afford any leakages, but must steadfastly set our face for greater efficiency and economy in handling. At present agents' charges are 5 per cent. on gross results London, less London charges ; and the selling charges are also 5 per cent. London.

COST OF PRODUCTION AND HANDLING.

One of the most serious aspects of the trade from the growers' point of view is the ever increasing cost of production and, more particularly, of handling this end. That the industry has nothing to thank the Commonwealth Government for has been proved over and over again. While they seem anxious to deal with wages and conditions of employment, it seems they never seem to consider whether an industry which is a rural one can stand the continual fretting away of the margins of profit which, for various reasons, have ever been small. The highly protective duties press heavily upon the fruit industry, as it does upon most rural industries which look to the markets of the world to absorb surplus productions. It is argued that we have our own local markets to ourselves, which is true, and we all fully appreciate them ; but the fact remains that you cannot regulate prices even to the paying stage when commodities are being produced in excess of local requirements. Without the outlook of supplying other markets than our own, the industry will never reach the importance and dimensions that it is capable of reaching if treated in a fair way.

The ever-increasing cost of living is constantly being urged as a reason for higher wages and more protection. The manufacturer of commodities and the man that handles them is able to pass the increased cost on, and the producer is the man on to whom they are passed ; but he is unable to protect himself, and, in addition, knows that owing to increased production prices are receding, and the world's markets are going against him. One great lesson which has to be learned in Australia is that if an article is going to cost

more to produce than it will bring upon the world's markets, it is not going to be produced. It is ever a wise policy for the individual as well as the State to stimulate the growth of productions for which your land and country is best suited ; but sooner or later the producers of Australia will wake up and refuse to be bled for the purpose of creating artificial conditions which pertain to the detriment of rural industries at the present time.

The requirements of the fruit industry have never been properly inquired into or treated fairly under the tariff. The present Commonwealth Government, under the plea that all paper required for wrapping fruit should be cut in Australia, imposed a duty of 35 per cent., which was a direct tax upon the export trade to the extent of 6d. a ream, and was just recently removed because of its ridiculous nature. But in the place of it the duty on timber, which is practically all imported for box-making for the export trade, was raised first from 3d. to 1s. 9d., and last year from 1s. 9d. to 4s. 6d. per 100ft. The result of this was that cherry crates being used at the time of the increase for Western Australia cost 2s. 6d. each ; the price was immediately raised to 2s. 8d., and plum boxes, into which 2s. worth of fruit had to be put, from 8d. to 8½d. each ; and all other export cases in proportion. And now there is a movement on foot in Melbourne by box manufacturers to increase the duty from 4s. 6d. to 10s. per 100ft., entirely ignoring the fact that for boxes it is possible to use much refuse at the mills, thus enabling the fruitgrower to get his boxes cheaper. But the action of these duties will be that all boxes will have to be cut from large timber of sound, importable quality.

Surely there must be an end to this insane policy, because it is killing the goose which lays the golden egg. The wheatgrower often complains that the merchant treats him unfairly over his bags, which cost only about 5d. each into which he is able to empty 12s. worth of his produce ; but the fruit-growers' package costs a shilling into which 3s. worth of produce has to be very carefully packed, and that package has to be entirely given away.

TRADE WITH AMERICA.

In a recent address His Excellency the Governor drew attention to the great trade changes likely to take place with the opening of the Panama Canal. Although this will not bring Australia nearer the European markets, it certainly should be the means of opening up an extensive trade in fresh fruit with the United States of America, and to a lesser extent with Canada as well. Markets must be found, as the area coming into bearing is increasing rapidly. Whether the market can be extended very much in Europe without lowering the price is doubtful ; whether a cheapening of transport and handling is possible remains to be seen. I believe it can this end by proper organising, and I believe uniformity will return increased values on the world's markets ; and also that if supplies were under more central control on those markets

the cut throat conditions at present prevailing, particularly when markets are over supplied, would not be felt so acutely.

I would earnestly ask growers to give their careful consideration to some of the problems suggested, and also to work together for the betterment of conditions. I have suggested what I consider some means by which this end can be obtained. We all know that a very large quantity of the fruit shipped last season to the European markets did not, for various reasons, return a payable price to the grower and shipper. The grower cannot go on producing and selling at a loss. We have the example in the butter industry of what uniformity of quality has done, and I believe that in the fruit industry equal results could be achieved if the growers would only take the matter up in the right spirit.

SMALL APPLES.

Mr. Quinn exhibited some apples, little larger than marbles, that were grown in South Australia, exported to England, and returned to the State. The Commonwealth Government, he said, had, by the Commerce Act, done a great deal in the way of improving the export fruit trade. The Act, however, did not prevent the export of small apples. If apples were only half grown, and they were branded "Under 2½ in.," the inspectors were not empowered to prevent the shipment. When, however, they had a little black spot on them, it was impossible to export them without marking that fact on the cases. He regretted that they were not in a position to prevent the export of inferior fruit. Last year, during February, Rome Beauty and other late varieties of apples had been shipped. He expressed the hope that fruitgrowers would use their influence to alter the state of affairs at present existing in connection with the Commerce Act.

Mr. S. R. Smith (Angaston) said it was disgraceful that growers should send fruit of the nature shown by Mr. Quinn oversea. If the fruitgrowers followed the suggestions of the writer of the paper material good would result to the industry.

Mr. Laffer, in replying, said that Mr. MacAlpine had stated that he had proved that bitter pit was practically created by the fluctuation of temperature to which export fruit was subjected in transit.

VOTES OF THANKS.

Mr. D. L. McEwin (Port Pirie) moved and Mr. A. J. Wedd (Mount Gambier) seconded a vote of thanks to the officers of the department, and the writers of the papers, which was carried with acclamation and responded to by the Director of Agriculture (Mr. W. Lowrie, M.A., B.Sc.).

CONFERENCE OF HILLS BRANCHES.

The Annual Conference of the Hills Branches of the Agricultural Bureau was held at the Institute, Meadows, on Monday, October 21st, when the Department of Agriculture was represented by the following:—Hon. T. Pascoe, M.L.C. (Minister of Agriculture), Messrs. F. E. Place, B.V.Sc., M.R.C.V.S. (Veterinary Lecturer), P. H. Suter (Dairy Expert), J. Miller, C. J. Tuckwell, G. R. Laffer (Members Advisory Board), and G. G. Nicholls (Secretary Advisory Board). In addition to a large number of visitors, the undermentioned gentlemen attended as delegates from the following Branches:—Uraidla and Summertown—Messrs. W. Pappin, E. Hart, N. Cobbledick, E. Hawke, L. M. Collins, W. Nicol, W. Squires, G. Prentice; Mount Barker—W. Pearson, D. G. Monfries, H. N. Bell; Woodside—H. F. Rollbusch; Meadows—J. Stone, W. M. Milligan, B. Usher, T. B. Brooks, T. Usher, T. E. Vickery, T. W. Vickery, J. Catt, G. T. Griggs, J. R. Morriss, T. Nottage, A. F. Ellis, S. Smith, and Rev. J. H. Williams; Clarendon—A. A. Harper, A. Harper, E. A. Harper, A. Phelps, H. C. Harper, T. B. Brooks, T. A. Shiedow, E. Dunmill, A. L. Morphett; Cherry Gardens—J. Lewis, E. Broadbent, J. Tozer, T. Jacobs, jun., H. Lewis, S. W. Chapman, T. Jacobs, C. Ricks; Longwood—W. H. Hughes, T. G. Oinn, E. A. Glyde, J. C. Blakely, A. W. Chiles, A. F. Furniss, W. Nicholls; Dingabledinga—H. Allen, F. DeCaux; Ironbank—J. T. Morgan; Morphett Vale—H. Sprigg, A. C. Pocock, L. F. Christie, E. E. Hunt, A. Benny. The chair was occupied by the President of the Meadows Branch (Mr. G. Ellis), and arrangements, which were in the hands of the local Branch, were excellently carried out by Mr. W. H. Bertram, the Hon. Secretary.

OPENING ADDRESS BY MINISTER.

The Minister of Agriculture, in declaring the Conference open, remarked that the large attendance at the meeting was a striking evidence of the desire on the part of the producers to obtain as much information as was procurable in regard to their callings. It was now generally recognised that the success of the State depended on the measure of success which attended the efforts of the primary producers, and therefore it was well for them to bear in mind that everything that was done to advance their interests was to the benefit of the State. In South Australia there were great variations of soils and climatic conditions, and because of this a person who could speak with authority with regard to the farming practices most suitable for one particular district was likely to be almost ignorant of the most economical workings for other localities. A comparison of the Hills districts where, he understood in a good many cases they could secure a livelihood from say eight

to ten acres, with that part of the north where he had been farming, where 1,000 acres was considered necessary, exemplified this. In the latter case they could do little in the way of intense culture, being practically limited to wheat combined with wool growing. The Hills districts embraced probably the most closely populated agricultural areas of the State, and it was therefore doubly important that they should work their land in conformity with the most up-to-date practices. Whatever they produced should be the very best of its kind. As an instance, let them consider dairying, which was so well adapted to the district. It was not more expensive to keep good cows than indifferent animals; but still there were those who were content to ignore the necessity of testing and culling their stock. His attention had lately been drawn to some figures bearing on this subject. A South Australian dairyman who systematically undertook the testing and culling of his herd, had 118 cows which averaged 437galls. per head for the year. Of this number 24 averaged over 2galls. daily during the period they were in milk; 70 in all averaged over 1½galls. daily, while 10 averaged under 1gall. While the average of the herd could be considered satisfactory, there were in it 30 cows which were returning no profit. The support given Cow-testing Associations in such countries as Sweden and Denmark was very strong, and the results of 10 years working of one Swedish club were interesting. Starting with selected cows, averaging during the first year 689galls. and a butter yield of 236lbs., they had by the end of the tenth year raised the average to over 1,000galls. and the butter yield to 345lbs. The test in the last year included 639 cows. Equally careful working with their fruit-growing would result in equally satisfactory improvements. During the last year, when so much damage was wrought by bush fires, the trouble was intensified by the fact that in many cases the grass had been allowed to grow between the trees. Had it not been for this probably only the outside rows would have been scorched, as he did not believe it possible for fire to travel any distance through a cleanly cultivated orchard. He was very pleased to note that the orchards he had passed on the way out that morning were well cultivated. Facts like these should impress on them all the necessity for good cultivation in their orchards. The State was dependent on oversea markets, and producers should ever remember that the only way they could successfully compete with other countries was by exporting only that which was of the first quality. Points such as these needed to be brought under the notice of agriculturists, and there was no better means of doing this than by the holding of such conferences as this. He expressed the hope that a pleasurable and profitable time would be spent by all, and declared the Conference open.

ROTATION OF CROPS AND SHEEP.

This subject was dealt with in the following paper by Mr. H. V. Sprigg, of the Morphett Vale Branch:—"To some it may appear that the title of the

paper includes two diverse subjects, and it is chiefly for that reason I have chosen it, as I feel certain that no complete and efficient system of mixed farming can obtain without a combination of the two if we are to retain, or rather to increase, the fertility of our lands and keep them in good heart, which should always be our main objective. When the fertility of the land is allowed to be run down by any method of farming, no matter how large the immediate returns may have been, we are simply deducting them from the capital value of the farm, and that is bad farming. This paper is meant to apply particularly to those districts south of Adelaide, with a rainfall of 20in. and over. Sheep on the farm must be looked at from a different point of view from sheep on a station. On the station the land value is low, and the wool is the main product. On the farm the land value is high, and the lamb and mutton form the main products—the wool may be regarded as the by-product—consequently I consider the crossbred ewe, preferably the Lincoln-Merino of good frame and robust constitution, crossed with Southdown or Shropshire rams, the best for farm purposes. There must always be differences of opinion as to which is the best breed; but whatever the breed be sure the sire is a true bred one, and that the dam has a strong roomy frame and robust constitution. We are all familiar with the direct earnings derived from sheep the lamb, mutton, and wool—and so I will deal with the indirect benefits. To begin with, I regard a flock of sheep as the cheapest, best, and most efficient ‘agricultural implement’ a man can have on his farm. It works itself and pays the farmer for allowing it to work. It cleans up the fallow and weeds and fertilises the land at the rate of about 3lbs. of liquid and solid manure per day, adding the essential humus to the soil, and in combination with a proper system of crop rotation will bring so-called worked out lands to a high state of fertility. Much of the land in the south has been continuously growing cereals alternately with bare fallow. This must in time exhaust the soil of humus and lessen its fertility. A year in grass will greatly improve this rotation; but what is absolutely essential to maintain the fertility is the inclusion of some legume in the rotation. A leguminous crop draws on the plant food supplies of the soil in different proportions from cereals, and also has the power, with the assistance of bacteria, of fixing some of the air nitrogen in the soil, and so adding to its fertility as well as partially resting it from a cereal production point of view. Now, I doubt if bare fallow is a paying proposition in this district when it is not necessary for water conservation purposes. We often suffer from too much water during the winter as from too little, and the returns from bare fallow do not compare favorably with the returns from a legume and cereal crop in rotation. The best rotation for this district is peas, wheat, barley, or oats, and two years in grass, the barley or oat stubble being harrowed or disked, and a little oats or barley, as the case may be, broadcasted over it, thereby yielding good early sheep feed. When rape

can be successfully grown it may be used in the same order in the rotation as peas, and it can also be used as a catch crop on the barley or oat fallows. With favorable summer rains it frequently gives good returns. For peas the land must be well ploughed and broken down to a fine tilth. For the following wheat crop good cultivation only is necessary. I prefer disking, and as the ground is left loose and friable after the peas no more work is needed to prepare the seed bed. The wheat stubbles will require ploughing for the barley or oats, and should be worked to a good tilth. The last two years of this rotation are completed by harrowing or disking in a catch feed crop on the stubble and a succeeding year of grass. This will give three cash crops—peas, wheat, and barley—and two feed crops in every five years, which means that with the sheep flock it earns every year. With a judicious use of chemical fertiliser the land should be in as good or even better heart at the end than at the beginning of the term, and will also have returned a larger income than would be the case with a bare fallow system. To get the best results from sheep the farm must be subdivided into paddocks proportionate to the size of the flock, that is, paddocks that can be fed down in a few weeks, thus permitting the feeding off of the grass paddocks in rotation, and also feeding off the growing crops when required. In this district cereal crops can be fed off up to the end of August, and with dirty or strong-growing early crops with a decided benefit. Weeds can be kept in check and turned into money by the sheep. A pea crop in the rotation will clean the land as well as fallow."

OTHER VIEWS AND QUESTIONS.

Mr. G. Griggs (Meadows) inquired what manure was most suitable for application to grass land?

Mr. Sprigg considered superphosphate, with perhaps a little lime, the most profitable dressing.

Mr. W. Pearson (Mount Barker) desired to know whether rape had been successfully grown in this district. His experience was that it was a risky crop to sow.

Mr. Sprigg thought rape should be grown as a catch crop. If good rains fell it would be generally found that the rape returned a good yield.

Mr. T. Jacob (Cherry Gardens) asked how it was possible for sheep to increase the fertility of the soil when the whole of the animal was built up from what was taken from the soil. A property adjoining his holding had for many years carried sheep. The land had not been artificially manured, and he was certain that it was by no means as fertile at present as it had been 30 or 40 years ago.

Mr. W. H. Hughes (Longwood) contended that the ploughing of the land did a great deal in the way of improving the pasture. If sheep were run

on it for very long it became trodden down too hard, and the grass crop was not so good.

Mr. L. F. Christie (Morphett Vale) was fully persuaded of the value of sheep for the purpose of keeping down weeds on the fallow.

Mr. F. A. Shiedow (Clarendon) believed that a great deal of good was done by putting sheep on to land immediately after the harvesting of a pea crop. They picked up peas which had been shaken out, cleared out weeds, and left the land much cleaner. He thought that where sheep were run into a pea paddock they would so increase the fertility of the land that it would be possible to grow a crop without the addition of artificial manures. During the last few years he had cleared a large area of land, and he found that by allowing a small clump of trees to remain on bare knobs he would cause the sheep to camp there. This resulted in these portions of the area being changed into fertile land.

Mr. B. Usher (Meadows) would not recommend turning sheep into a full crop of peas, as they travelled a good deal, shook out peas, and trod them in. He advised the harvesting of the crop and then allowing the sheep access to it.

Mr. W. L. Summers (Secretary Minister of Agriculture) said the answer to Mr. Jacobs' question depended very largely upon the meaning placed on the term fertility of the soil. He took it as used by Mr. Sprigg to mean the ability of the soil to produce crops, and in this sense the judicious grazing of the land in a system of rotation as outlined had been shown by experience in many countries to maintain and even increase the fertility of the soil. Although the soil might contain less plant food in a given depth, at the same time the cultivated depth contained more food in a form available to the plant. Any soils in the district contained sufficient plant food to grow good crops, but it was necessary to get this into a condition in which the plant could make use of it. That bare fallow could to a certain extent be dispensed with in these districts was proved by the experiments of the department on Mr. T. Pengilly's farm at Aldinga, where wheat after rape had averaged about 20bush. per acre during four or five years; a higher average than obtained throughout the district off fallowed land. On the same farm rape and peas had been grown successfully for a number of years, and it was interesting to observe the large increase in area in this locality that was now cropped with peas prior to the hay crop. Mr. Pengilly had also carried out a series of experiments in the feeding off of barley, rape, and rye for several years, and he believed these crops had carried on the average the equivalent of four sheep to the acre for the whole year. These green crops were of course available only for a few months, but, as it was best to feed off quickly, as many as 75 sheep per acre were grazed on them for short periods.

Mr. D. G. Monfries (Mount Barker) advised the feeding off of peas with lambs just when the crop was ready to harvest. In cases where the peas

had been stacked and then fed it was found that they did not do so well. Messrs. Pope Bros., of Mount Barker, emphatically stated that they had secured the greatest returns from lambs turned straight into the crop.

Mr. W. Pearson (Mount Barker) strongly warned members against depending too much on rape. He had tried it for six years in succession. At the Meadows he had put it in on three occasions on land that had previously grown an excellent crop of hay, but the rape was a complete failure. At Mount Templeton he put in 60 acres, and the crop did not even color the paddock. White mustard was a reliable crop. On one occasion he sowed this mixed with rape in equal proportions, and while it returned an excellent crop, the rape did not come up. Lambs fed on the white mustard had averaged about 46lbs. per carcass for export. Wherever sheep were kept on the farm and grazed judiciously they improved the producing capacity of the land. Close grazing for a number of years would certainly impoverish soil. If they cultivated it, grew a cereal crop on it, and then put on sheep they would increase the yielding capacity.

IMPROVEMENT OF GRAZING PADDOCKS.

Mr. H. F. Rollbusch (Woodside Branch) read the following paper on this subject:—"In the case of many of the grazing paddocks in this district very often there is more bare land than grass showing, the roots even having disappeared through overstocking. The farmer does not appreciate the destruction of the heifer calves from his good cows, but in sparing them he gradually accumulates more than he can properly provide food for, especially when a season such as the present is experienced. The result is that where some years ago pastures were covered thickly with a luxuriant growth of grass the herbage is now short and scanty. It is desirable, therefore, in the interests of our pockets as well as for our pleasure, that we should do something to promote conditions that will improve the growth of the grasses. It may be necessary in the first place to reduce the number of stock, but in some cases the paddocks are in such a bad state that it would take a long time to restore them by merely spelling them. It would therefore be necessary to put something into the ground to stimulate the growth. When cropping land we add manure unless it is exceptionally good soil, where a rotation of crops may be sufficient, but many expect the grazing land to go on yielding year after year, to be continually eaten off with no return made to the soil, some even gathering up the droppings from the stock—even this small return being denied the soil. There are some, however, who have awakened to the fact that something needs to be done, and are manuring on a small scale, chiefly with grass manure, and no doubt this should prove a benefit; but we cannot expect this to suit all localities or soils. It may be necessary to experiment with different manures, to find out which is the most suitable for our soils, unless we have it analysed. I think that bonedust is the best

all-round manure, and one very suitable for this district, as I have seen the good results that it has given, not only for one year, but many. Twenty-three years ago I ploughed up a piece of land and planted part of it with potatoes and put a little bonedust with each set. The paddock was then left for grazing for over 20 years, and every year when the grass grew it showed not only a better growth on the whole piece where the potatoes had been planted, but where every row had been there was plainly visible a thicker and better growth still. When I broke up the ground again 20 years later, and grew other produce, the good effects of the bonedust were seen upon this also. It is not like some manures, whose benefits appear to last for a year only. I once sowed about 3cwts. of bone super. on a little more than an acre of land. I kept the stock off it, and it grew an enormous quantity of grass, which I made into hay; but it seemed to exhaust the land, for the following year it grew very little. With bonedust the good results show for years. Not only is it good for the soil but good for the stock, for they feed with greater relish on the grass grown on bonedusted land, and consequently thrive better. I would therefore recommend sowing 2cwts. (or more if possible) of bonedust to each acre of grass land annually for several years. This, I suppose, could be done for 12s. per acre, or 15s. if drilled or harrowed in. I do not think it is necessary to harrow or drill it in unless it is upon a hillside; then harrow or drill it across the hill, not up and down, or the greater part of it may wash away. On the level parts it would suffice to simply sow it and allow the rain to take it down to the roots, keeping the stock off it until a few showers of rain fell. The beginning of the winter is the best time to apply the manure. The question will naturally be asked, will it pay? I certainly think it will. Twelve shillings or 15s. may seem a lot extra to obtain from an acre each year, but it only means, with an average price of 6d. per gallon, 2½galls. to 30galls. of milk a year extra for each acre, or a trifle over half a pint per day. It would not be advisable to increase the stock to get the extra return for the increased outlay for a few years at least, but to look for it in better condition of the stock and an increase of the yield of milk. As a result of manuring the grasses grow thick without the addition of grass seed. With bonedust, of course, all the benefit will not be visible, neither will it be exhausted in one year, but it will last for many years, and if the quantity is added yearly for several years there will be feed for an increased number of stock. On large farms no doubt the keeping of sheep is of great benefit, but where this is not practicable, and it is desired to continue dairying, the annual dressing of bonedust or some other manure suitable to the locality will be of great help and benefit."

Mr. F. H. Shiedow (Clarendon) instanced a case where 15 years ago farmyard manure had been put on grass land. The result of this dressing was visible to the present day. However, with some of the grazing land in the

district it was almost impossible to apply manure on account of its uneven nature.

Mr. F. DeCaux said the chief cause of the impoverishment of the land in the district was overstocking. While the droppings from the animals added to the fertility of the soil in the summer, in the winter the value of this manure was largely lost, as the rains washed it away.

Mr. S. Smith (Meadows) expressed the view that the land was improved by the addition of leaves shed from the trees. If they burned more of the rubbish in the shape of gum leaves, &c., the potash would nourish the land. There was plenty of grass seed in the soil, all it required was stimulation.

Mr. C. Ricks (Cherry Gardens) stated that in the old country a great deal of attention was paid to the manuring and harrowing of grass lands. He believed that 30 acres of well-cultivated grass land would give a return equal to that from 80 acres worked under the present system.

THANKS TO THE MINISTER.

At this juncture, at the instance of the Secretary of the Meadows Branch (Mr. W. H. Bertram), a vote of thanks was extended to the Minister of Agriculture.

In reply the Minister expressed his surprise at the fact that no one had mentioned the use of lime for the purpose of improving the land in the district. Whilst he was coming along that morning the land near Meadows had appeared to him to be extremely cold. One of the best fertilisers for cold-soils, especially when clay lay underneath, was lime. In so far as the value of animals as manuring factors was concerned it was well known that even in grazing some of the essential elements of fertility were removed from the soil. At the same time stock would not take off anything like the quantity that would be removed in a crop of hay, and, further, would return a certain proportion in the droppings. The aim of the farmer and the dairyman should be not only to maintain the degree of fertility, but also to increase it. Professor Perkins was conducting some exceedingly interesting experiments at Roseworthy, with a view to ascertaining the effects of different quantities of artificial manures upon the pastures. Sheep were weighed into and out of special plots, and the contrast between the carrying capacity of the land heavily manured and that only lightly dressed was very marked. Personally he was convinced that the results of the investigations would be a complete eye-opener to landowners throughout the State and prove to be of much benefit. Every farmer, in a small way, should be an experimentalist. If he were, the advantage to the country would be tremendous, because generally when a tiller of the soil made a discovery of value he was not slow to pass the information on to his neighbor.

AFTERNOON SESSION.**CONTAGIOUS MAMMITIS AND CONTAGIOUS ABORTION.**

In an interesting address on this subject the Veterinary Lecturer (Mr. F. E. Place, M.R.C.V.S., B.V.Sc.) said there were very few farmers who took the trouble to cut up the udder of a cow for the purpose of studying its constitution, and for this reason he mentioned that this portion of the beast was divided into two separate halves by a layer of tissue, which acted simply as a means of support. Each of these halves were again divided into two quarters containing glands, a special form of animal substance required for a special kind of work. The particular function of the udder was to rob the blood of the substances which were needed to make milk for the support of the young primarily, and secondarily to continue the process as long as possible for dairy purposes. The manufacture of the milk was carried on by the cells extracting from the blood that portion they required. This arrangement required a special blood supply. A glance at the milk veins, which would reveal whether they were well developed, would enable one to tell the good yielding cow. Although they were quite correct in judging the cow's capacity for milk production from the condition of what were usually regarded as the milk veins, these were generally channels which were taking from the udder blood that had already been treated there. They were called milk veins, but they were not veins at all, being vessels which took away waste matter. They ran side by side with the veins, and for all practical purposes they might be regarded as such. In order that they might carry away the blood, however, it was necessary that they should have arteries to bring the blood to the udder. From these it was distributed amongst the fine network of arteries which ran alongside the special milk cells. The changes which were effected here were of a totally different nature from those which took place in other parts of the body. If they made analyses of blood and milk they would find that, although the substances in the milk were already existent in the blood, there was a considerable difference in the proportion of the constituents. For instance, in blood soda salts would be found in excess, whereas in the milk potash salts would predominate. It was necessary that these changes should be under the control of the nervous system of the animal, wherein arose the vast differences between the milking qualities of the different beasts. Knowing this, it was a mistake to unduly hurry or excite the cows, and a change of the milker, housing, or feed affected the flow of milk, pointing to the fact that the secretion was under the immediate control of special nerves. In order that the blood supply might come into the udder, and be treated in this way, it was necessary to provide for a complete system of drainage. Part of this was carried out by the milk veins which were visible and part by the lymphatics. These were the receiving junction of the waste products of the blood, and in the udder they were placed high up in the hind quarters. All the waste that was not fit to

go back into circulation was dealt with by these. The constituency of the milk could be immediately modified by the food that was given; but the food not only affected the quality and the quantity of the milk but the capacity of the milk gland itself, and thus the working power of the gland depended on the nature of the food that was given. It should also be remembered that when there was a delicate organ like the udder to deal with it must be treated carefully. At the first calving of the heifer, when the blood circulation was being readjusted, the udder would probably be the weakest point of the whole system. Therefore the animal should not be subjected to unnecessary violence, changes of temperature, changes of feed, &c. Every damage that was done to the udder should not be called inflammation of the udder. Many persons mistook ordinary congestion as mammitis. The highly-strung nervous young heifer coming into calf desired to send as full a flush of milk into the udder to feed the calf as was possible, and so materially affected the changes which were going on inside that portion of her body. The udder swelled and filled out for the purpose, and perhaps the dairyman gave her more food. Then it would be noticed that the beast got fidgety and the udder became still larger. The teats stood out and were painful, and there was a decided swelling running along from the front of the udder to the belly, and down to the hind legs as well. Under natural conditions the calf would relieve the trouble by sucking the teats. The application of lard or butter was much better than the rubbing in of some strong stimulating liniment. Although this condition was relieved by simple remedies there were cases that presented greater difficulties. The pain was so great that the animal showed signs of it. These were real cases of udder ills. The milk cells had to go on working, and the network that supported them became torn and painful, and the whole condition foreshadowed the loss of the milk in one or more quarters. In this part of the world occasional diseases formed in the udder, and there was a dark purple staining of the skin. This occurred through neglect in watching the animal. In the great majority of the cases, if the congestion stage had been carefully treated there would have been no trouble with this. Under the microscope the congested state of the udder described above and contagious mammitis could be easily distinguished. The latter disease was co-existent with the presence of certain germs which got into the udder by various means. They got in with the blood that was flowing into the udder, and multiplied in the drains by which the waste was carried away; but more commonly they obtained access through the opening of the teats, and when once in their numbers grew rapidly. The trouble was transmitted by the cows lying down on affected areas, or through the hands of the milker. There was a very simple remedy, viz., warm soapsuds well rubbed in. The milk would perhaps be somewhat thick, and it would be found that it was acid, the result of the growth of these germs, and the amount of soda in the soap was sufficient to counteract the

acidity of the udder, and so render it an unfavorable ground for these germs to grow in. Therefore, if there were any suspicion of anything of this nature going through the milking herd it would pay to thoroughly cleanse the udder with soapsuds. If a more acute form had to be dealt with a solution of boracic acid could be squirted into the teat. About three-quarters of an ounce dissolved in a pint of warm water and 4ozs. to 6ozs. administered to each quarter daily for a few days and then at longer intervals for a week or two should be effective. This would render the germs weak and sickly. When there was any suspicion of the existence of the disease in the herd the suspected animals should be milked at the last.

CONTAGIOUS ABORTION.

The lecturer drew attention to the fact that about 28 years ago so much difficulty was occasioned by this disease that strenuous efforts were made to discover the cause. Seven or eight years ago the germ responsible for the trouble was recognised, and it was now known that the membranes of the cow's womb and vagina were a favorite growing ground of this particular germ. The result of its presence was that cows would throw their calves generally between the third and seventh month, and although they returned to the bull they rarely became impregnated. These were the only symptoms one was likely to notice in the case of an outbreak of contagious abortion. The first step necessary in treatment was the thorough destruction of the aborted calf. A curious feature in this regard was that where an aborted calf was left exposed all the pregnant cows exhibited an interest in it, with the result that they were very likely to get germs into their systems. Some authorities contended that the chief means of infection was with the feed. A strong solution of perchloride of mercury or kerosine oil should be thrown over the beast, and it should be burnt. Then the place of burial should be well dug over, as otherwise the cows remained on the edge of the burnt ground and ran the risk of infecting themselves. If the disease were well established, and it became necessary to take some active measures to stop it, a packet of tabloids of perchloride of mercury and about 3ft. of $\frac{1}{2}$ in. rubber tubing, together with a glass or enamel funnel, should be procured. It was useless to put the solution into any metal receptacle. One of the tabloids should be dissolved in an ordinary wine or whisky bottle filled with water. A few inches of the tube should be inserted into the bearing of the cow and the mixture poured into the funnel from the height of the balance of the tube, thus disinfecting the vagina of the animals. Where the calf had been slipped it would be often found that there was a persistent discharge from the cow. It was then necessary to syringe the animal's teats daily for three days, and then once a week for three weeks. A bull should be kept for the service of those cows that were affected, and after service the sheath of the beast should be syringed. An authority in the old country stated that when an animal

slipped its calf it would be immune to further infection. It would generally be found, however, that such cows would not be got in calf. It was possible to tell, by subjecting the blood to certain processes, whether the germ of abortion was in the system. As a practical means of preventing the spread of the disease in a district such as this he recommended the destruction of the aborted calves with perchloride of mercury.

The address was followed by an interesting discussion, in which a large number of delegates took part. Questions relating to the subject matter of the lecture, as well as to various points of interest to stockowners, being asked and satisfactorily explained.

THE BUSH FIRES ACT.

Mr. T. Jacobs (Cherry Gardens) submitted the following resolution:—
“That landholders in certain districts be allowed to burn scrub, &c., in November, both by night and day, and in February, March, and April by night in addition to the daytime, as already allowed.” In introducing the motion he said that the provisions of the Bush Fires Act, in so far as they applied to the hills and a good many other districts, were most unsatisfactory. Landholders were not permitted to burn during November, and it was very seldom, in this district at least, that burning could not be carried out with perfect safety during that month. He blamed the Act in a large measure for the extent of the damage which had been done last summer by fires, for had landholders been able to each burn breaks at their discretion the fires would have been confined to limited areas. The Act permitted the burning of scrub at any time, provided an area of half a chain width was cleared around the scrub to be burnt. This was by no means an effective break. Another point was that fires were not to be lit at night. He contended that it was much easier to control a fire during the night than was the case in daytime.

Seconded by Mr. J. Stone (Meadows).

Mr. G. G. Nicholls (Secretary Advisory Board) drew attention to the fact that Congress had passed a resolution as follows on the subject:—“That district councils be empowered to fix the dates as well as hours for burning stubble and scrub in their respective districts.”

Mr. A. L. Morphett (Clarendon) moved as an amendment that the resolution of the Annual Congress be supported by the Conference of the Hills Branches.

Mr. W. Pearson (Mount Barker) seconded the amendment, which was carried.

NEXT CONFERENCE.

Delegates from the Clarendon, Longwood, Mount Barker, and Morphett Vale Branches expressed a desire that the next Conference should be held in their respective towns. It was eventually decided to accept the invitation of the Mount Barker Branch.

CONSERVATION OF WATER.

This subject was dealt with in a paper by Mr. Brooks, which he had previously read at a meeting of the Clarendon Branch, and which is to be found on page 378 of the October, 1912, issue.

The subject was discussed at length by delegates.

Mr. W. Pearson (Mount Barker) had constructed a reservoir in the hills. He commenced with the idea of raising the embankment to a height of about 18ft. When it reached 13ft. he found that there was insufficient width to allow of the scoop being used on top. The width of the bottom was 51ft. He placed a 3in. pipe underneath the embankment at the lowest level of the dam, and by means of this was able to completely empty it by gravitation.

THE ADVISORY BOARD AND BRANCHES.

Mr. G. R. Laffer (Advisory Board), in expressing his pleasure at being present at the Conference, stated that the large attendance spoke well for the interest taken in the Bureau by agriculturists. At present the Bureau was stronger than it had ever been, and the Board had been strengthened by the addition to its membership of Professor Lowrie, and Messrs. F. Coleman, of Saddleworth, and C. E. Birks, of Wandearah. That body was always ready to give due consideration and attention to matters which Branches brought before it; but he urged them to thoroughly weigh all the evidence before making a recommendation to the Board. The Secretary to the Board (Mr. G. G. Nicholls) had done a great deal since his appointment in furthering the interests of the Bureau, and he paid a tribute to his energy and enterprise.

IRRIGATION IN THE HILLS.

Mr. C. Ricks (Cherry Gardens) read an interesting and instructive paper on this subject, the text of which will be found on page 858 of the March, 1912, issue.

EVENING SESSION.

PROFITABLE MANAGEMENT OF THE DAIRY HERD.

This was the subject of an interesting address delivered before a large gathering by Mr. P. H. Suter, the Dairy Expert. He pointed out that dairying was one of the most profitable branches of mixed farming, and that the housewife who milked cows and kept poultry was able to provide the necessities for the house, keep the family well clothed, and still have enough left over for the purchase of seed wheat for the farm. In some districts there was too much uncertainty about the climatic conditions, and in those cases the sensible farmer would not depend altogether upon his cereal returns.

The advantage of dairying lay chiefly in the fact that it admitted of immediate returns. In New South Wales, Victoria, New Zealand, and Denmark the industry had proved to be the salvation of the people. He knew of many instances where farmers would certainly have gone through

the Insolvency Court had they not diverted their attention to cows. Unfortunately many people had become too prosperous and contented, and, consequently, they depised the work essential in the management of a dairy. He quoted Denmark as an illustration of sound dairy practice. That country once was in sore straits, but by wise legislation and co-operation in dairying, it had become one of the richest in Europe. Although only one thirty-third the size of Victoria its dairying industry to-day was worth £20,000,000. The Danish dairyman had brought his methods of management up to a high level by keeping careful records of the milk and butter yields of each cow. Thus, those cows which were unprofitable were eliminated from the herd, with a consequent increase of profit to the dairyman. One successful dairy farmer had said just as the enrichment of the soil gave the best conditions for the seed, so a well-grounded humanistic training provided the surest basis for a good business capacity. Business management was lacking to a large extent among South Australians, especially in respect to the testing of dairy cows. He had always strongly recommended the more general use of the scales and the Babcock tester on the farm. He was pleased to report that a number of farmers were now employing them. Testing associations he regarded as valuable, but such organisations would not prove successful in the central State, except in isolated areas, principally because the rural population depended more on mixed farming. The settlers were more scattered than in the dairying districts in the eastern States, and held comparatively large areas. He advised that a few farmers in each district should buy a testing outfit between them, and he would give them thorough instruction how to perform the work. Already that course had been adopted in some localities. The man who trusted to guesswork in appraising the productive value of each cow was likely to allow a serious leakage in his annual returns. Proof of this was supplied in the case of a farmer who had singled out the best six cows in a herd of 40, and had then tested the whole herd. At the conclusion of the lactation period he had found that his chosen cows stood in the following order of merit:—First, the fifth cow on the picked list; second, a cow not on the list; third, the fourth of the selected animals; fourth, a cow not on the list; fifth, the beast first on the list; sixth, the animal which he had placed second on the list. That demonstrated that guesswork might be very misleading. He considered that fully 40 per cent. of the cows now maintained on the various farms were “boarders.” The unprofitable animals should be passed off to the butcher, and not transferred to some unsuspecting brother. He cautioned dairymen that it was unwise to condemn a cow on a test covering only its first lactation period, particularly if she had come from a good milk-yielding family. Another point to be remembered was that an adequate and judicious food ration was necessary before they could properly pass judgment upon a cow. He had in mind a cow sold by a so-called dairyman for a few shillings, because she was regarded as a failure. Her new owner

fed her well, with the result that she not only showed a record of more than 26lbs. of butter a week, but won a handsome prize.

CHOOSING A BULL.

They had always to bear in mind that the milk went down the throat. An approved bull was an essential. Unfortunately there were some dairymen who would use any animal to save expense. The practice of selecting a bull calf from a scrub-bred herd had nothing to recommend it. The bull should be chosen from a pedigreed deep milking strain, with a view to breeding for improved milk and butter capacity. Careful mating of purebred sires with common cows would enable them to grade up and bring about a decided increase in average production. He discouraged the practice of keeping heifers whose mothers had been failures at the pail. Assuming that a farmer owned a herd of 30 cows, it was safe to reckon upon 15 heifers a year. If these were the progeny of a wisely-selected bull their value would be nearly doubled. He had known of a herd's production having been increased in that way to the extent of 4lbs. daily per cow. Allowing that the period of lactation extended over 270 days, the increase indicated meant an improvement of 1,080lbs. a cow. In six years the enhanced production per cow, with the milk valued at 6d. a gallon, would amount to £16 4s.

For an hour and a half at the conclusion of his address Mr. Suter was kept busily engaged in answering questions. He emphasized the importance of cleanliness in the dairy, the necessity of proper feeding, and the value of judicious breeding.

GENERAL FARM MANAGEMENT.

An interesting paper on this subject was read by Mr. N. Cobbledick (Uraidla), in the course of which he pointed out that the homestead should be made as bright and attractive as possible, and in addition should be kept in good condition and repair by the landholder. A good substantial fence should surround the property, and it was advisable in all cases to keep good young stock. It was hard to estimate the value of the cow on the farm, as in addition to the supply of milk and cream there was the profit derived from feeding the surplus to pigs. These latter animals should be supplied with warm well-drained styres, which should be cleaned out at regular intervals. A fair number of good hens regularly supplied with shell grit, clean water, and an abundance of green feed should be kept in good clean yards. He advised all farmers to leave a belt of timber on their property for the purpose of shelter, and also to provide a supply of firewood for the home. Cropping should be done systematically, and where necessary drains should be put down to take off the floodwater. The irrigation of a small plot would enable the landholder to grow summer crops for the stock, and strongly recommended the growing of field peas as a change crop. No homestead should be without a fruit orchard, to which careful attention should be given.

ARSENATE OF LEAD ANALYSES.

The following nine samples of Arsenate of Lead, procurable from Adelaide dealers, have been analysed by the Government Analyst (Mr. W. A. Hargreaves, M.A.), with the results detailed below:—

No.	Name.	Approximate Weight of Contents of Package.	Weight of Water in Package.		Dry Weight of Arsenate of Lead.	
		Ozs.	Ozs.	Grs.	Ozs.	Grs.
1	"Electro"	17½	6	170	10	376
2	"Electro Bordo Lead"	16	9	315	6	122
3	"Our Jack"	16½	0	44	16	284
4	"Electro"	14½	0	24	14	304
5	Merck's	16½	0	27	16	82
6	Swift's	18½	9	109	10	328
7	"Bluebell"	15½	5	152	10	176
8	"Hemingway's"	32	17	185	14	252
9	"Nicholl's"	15½	5	174	9	372

ANALYSES OF SAMPLES ON THE DRY BASIS.

No	Oxide of Lead (PbO).	Arsenic Pentoxide. (As ₂ O ₅).	Water Soluble Arsenic Pentoxide.	Water Soluble Lead Oxide (PbO).	Copper Oxide (CuO).
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
1	62.48	32.39	0.22	Trace	—
2	46.85	23.79	0.10	"	7.10
3	62.37	27.77	0.23	"	—
4	65.34	32.29	0.17	"	—
5	72.14	22.38	0.06	3.86	—
6	64.02	27.58	0.30	Trace	—
7	66.94	21.15	0.08	"	—
8	62.20	33.05	0.88	"	—
9	62.22	32.17	0.26	"	—

N.B.—No. 2 is a mixture of arsenate of lead and Bordeaux paste. Arsenate of lead should contain not less than 25 per cent of arsenic pentoxide (As₂O₅) combined with lead, and not less than 1 per cent of water soluble arsenic compounds, calculated as arsenic pentoxide, both calculated on the dry basis.

AGRICULTURAL BUREAU REPORTS.

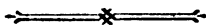
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* No report received during the month of October. † Only formal business transacted at the last meeting.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

November 13th, December 11th.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, September 26.

(Average annual rainfall, 11½ in.)

PRESENT.—Messesrs. T. O'Donoghue (chair), S. Thomas, J. J. Cormack, T. Griffin, A. J. Phillis, T. Ward, R. Brown, D. P. Aitken, H. K. Gum, A. Wallace, A. Crisp (Hon. Sec.).

LUCERNE-GROWING.—Mr. H. K. Gum read the following paper on this subject:—“Owing to the very uncertain rainfall in this district it is necessary to irrigate in order to grow lucerne successfully. After a test extending over a period of six or seven years, I consider that the flooded lands in this district are very suitable for lucerne-growing. The best seed obtainable should be procured. I prefer the Hunter River variety, as it is a rapid grower and thrives well. It can be grown with wheat on well-worked fallow, but great care must be exercised not to bury the seed too deeply. One paddock of lucerne, which has done remarkably well, was only trodden in by sheep. The wheat had been up for some considerable time, and immediately after the lucerne was sown a flock of sheep were turned on to it and kept there until the wheat was fed off short. The sheep were turned on about the middle of July, and by hay-making time there was an excellent crop of lucerne with the wheat. The majority of it was then cut for hay, which had the effect of making the lucerne stool out and grow much thicker. This took place six years ago, and the lucerne has done well through the summer and winter up to the present time without having been once cultivated. During each of the past two summers it has gone three or four months without any flood waters running over it, but it has continued to grow well without apparently suffering for want of moisture. Previously to that time, however, it received several floodings throughout the summer months of each year. This paddock is sufficient proof that lucerne can be successfully grown on overflow country, even with the moderate average rainfall of about 12 in. Once lucerne is established a long dry summer has very little effect upon the crop. As soon as a good rain falls it commences to grow. The sample tabled was taken from a paddock that had a fire through it in April of last year. Later on it was fallowed, and has been scarified and harrowed several times since, with the result that the lucerne, which was sown about four years ago, has made this remarkable growth in 10 weeks, *i.e.*, since seeding was finished. This proves that ploughing or cultivating has no detrimental effect upon lucerne, but is rather inclined to make it grow much better. The great advantage of lucerne is that it is at its best when all other feed is dry, *i.e.*, during the summer months. Six or seven pounds to the acre is sufficient seed to sow, as it will naturally get thicker each year. If it is too thick it becomes root bound and will not thrive. Should this occur it is advisable to cultivate it. This will break some of the roots and prove very beneficial to the crop. It is possible for all who have any land that is occasionally flooded to secure similar results. There is nothing that will give better returns as feed than lucerne. I would advise everyone to give it a trial, but care must be taken that the seed is not buried too deeply. Once a lucerne plot is established it is a most profitable undertaking, and there is very little work attached to it.” A good discussion followed the reading of the paper.

Coomooroo, August 29.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berryman. (chair), W. Robertson H. Fisher, A. Cooke, A. Brice, F. Gregory, E. and R. Brice, C. and C. Phillis, R. G. Polden (Acting Sec.), and one visitor.

LUCERNE.—Mr. H. E. Fisher read a paper on this subject. While lucerne was most successfully grown where it could be irrigated, he said, it could be grown without irrigation on very many farms. On nearly every farm suitable plots of ground were available for an experiment with this fodder. In the North it was advisable to select a piece of low-lying ground on to which the floodwaters could be turned. Good crops had been grown in this way in the North. The method of sowing he advocated was to put the seed in with the wheat, which protected the young plant. Mr. Robertson had not been successful with lucerne sown with wheat. In his experience the sowing had to be done too early for the lucerne. Members were of the opinion that 50 acres of good lucerne ground, when fully yielding, would provide a living for a man who carried on dairying and fattening stock.

FALLOWING.—Mr. Robertson drew attention to the fact that many crops in the district were being partially choked by weeds, the seeds of which had not germinated in the fallows till after seeding. The difficulty was that the oats did not grow in time for the farmer to kill them by cultivation. He urged shallow ploughing with skimming or light cultivation late in July to get the fallows clean. Mr. R. Brice said that oats would grow more quickly after the cultivator than they would after the plough. The trouble was that in these areas farmers could not keep enough cattle through the summer months to keep down the weeds on the fallow in the winter and spring. Mr. A. Cooke considered that fallowing should be finished in July and afterwards worked down fairly fine. He would sow whenever possible after rains. Members generally agreed that shallow ploughing to get the oats up as soon as possible was the main factor in cleaning fallow ground.

Coomooroo, September 23.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. E. Berryman (chair), Brown, Robertson, E. and R. Brice, Phillis, Cooke, A. C. Brice (Acting Hon. Sec.), and two visitors.

FARM IMPLEMENTS AND MACHINERY.—Mr. A. C. Brice read a paper dealing with the care of implements and machinery. The life of an implement, he said, must be reckoned by the acreage worked rather than by the length of time in use. Implements and machines were costly, and if worn out by bad treatment and carelessness were of little value for any other purpose. In purchasing, the farmer should be sure that his implements were strong enough for the soil to be worked and for the team strength to be used. The farmer's desire for a light draught implement led the manufacturer to make one that was not durable. He would prefer an implement without a seat upon it, so that instead of allowing for a man's weight the implement itself would be heavier and stronger. Upon examination of a new machine or implement any part causing needless friction should at once be attended to, and as the implement became older a watch should be kept for wearing parts which could be packed or repaired in time to save costly renewals and breakdowns at an awkward time. Thorough oiling was necessary to prevent the wasteful wearing of parts. When not in use all implements and machines should be stored in a good shed. The best protection for woodwork was boiled oil, and two coats a year would preserve the appearance as well as lengthen the life of the implement. The oil should be put on when the wood was perfectly dry. He had recently seen two wagons, one built three years ago, while the other had been in use for nearly 40 years. To the ordinary observer the old wagon, which had been properly cared for, would certainly appear to be the more recently built. He made a practice of leaving the oil on the bearings while the implement or machine was out of use, and cleaning it off just before it was called into service again. This would prevent the bearings from rusting. Some oils would cake if used on a fast-moving bearing, while others would run to waste on the parts that revolved more slowly. A drum of machine oil, another for cultivating implements, and one of boiled oil used judiciously on a farm plant would save a lot of money every year.

Craddock, September 28.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. J. Patterson (chair), Graham, Neylon, Harris, Jago, Clarke, Glasson, Gillick, Adams, P. Neylon, J. Smyth (Hon. Sec.).

DRY FARMING.—In a discussion on this subject, Mr. A. Clarke said it was necessary to rid the land of weeds in order to grow wheat. In the earlier days there was very little grass with which to contend. He did not think working the land more than in the ordinary way was required, as in former years good crops were grown with the ordinary ploughing and harrowing. Mr. P. Neylon considered that if the farmers in the wet districts were to cultivate as was done here they would not grow payable crops, with which opinion Mr. Jago agreed. The Secretary thought too much work could not be put into the land here at the right time. As an instance, some farmers in a 20 in. rainfall fallowed the land for two seasons and cultivated between in order to keep the weeds under. With this system of cultivation 50 bush. to the acre had been harvested, whereas on farms where the land had only been fallowed once 20 odd bushels to the acre were returned. This gave a good margin, considering the extra labor entailed and the idleness of the land. Mr. Graham put in a crop of wheat last year in the ordinary way, i.e., fallowed in August and broadcasted the seed and harrowed it twice, and reaped more wheat than was secured from his neighbor's adjoining paddock, who tilled his land under the dry farming system. Some years ago he worked his cultivators on the headlands, going to and fro to work, until it became a dust-hole, and when the rain came it caked. The return from it was not so good as where the land was not worked so much. Tilling and manuring were of no use without moisture.

Hookina, September 24.

PRESENT.—Messrs. D. Madigan (chair), J. Henschke, J. Carn, P. and T. Kelly, B. and P. Murphy, S. Stone (Hon. Sec.), and three visitors.

PREPARATION OF THE WOOL CLIP.—Mr. Henschke addressed the meeting briefly on the subject of preparing wool for market. He always classed bellies, pieces, and locks separately, and where necessary made two classes of each. Heavy, greasy fleeces should be classed independently of lighter wool, as the selling value was affected if they were mixed. It was inadvisable to make the bales too heavy. Mr. T. Kelly said that in Ireland sheep were always washed before shearing. This practice could, in some cases, be followed here.

Hookin, October 26.

PRESENT.—Messrs. D. Madigan (chair), L. Woods, J. and A. Henschke, J. Carn, P. and T. Kelly, B. Murphy, S. Stone (Hon. Sec.), and two visitors.

HAYMAKING.—Mr. S. Stone read the following paper on this subject:—When sowing for hay, it is advisable to sow hay varieties. A wheat that produces an abundance of flag is preferable to a clean strawed sample. It is also better to sow an early wheat, as this allows more time for stacking before later wheats are ready for the stripper. Much of the quality of hay is lost through not cutting it at the right time. The straw should not be too dry, especially where it has to be fed long, as the stock will eat the heads and leave the hard stem. It should not be cut too green, as it then becomes light and marshy. The binder is the best means of handling the hay crop, as it is the least wasteful. It also makes it possible to cart and stack in windy weather, which often means a great saving in time. It is advisable to leave the sheaves a day or two after they have been cut. Where they are still fairly green it is safest not to put too many into a stook, 10 or 12 being sufficient. When building into a stack, keep the outside sheaves fairly level. This lessens the tendency to slip either way and makes building easier." Mr. B. Murphy advised harrowing the ground to be cut for hay, and preferred Bluey and Fill-the-bag as hay wheats. Mr. A. Henschke thought Purple Straw the best variety. Mr. Kelly preferred loose hay to sheaves for feeding long, as horses could not eat off the heads so easily. Mr. Madigan said King's Early was a good wheat for hay, and thought the binder had many advantages over the mower.

Orroroo, October 25.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. M. W. Forrester (chair), H. J. Cottrell, R. Shillabeer, S. S. Hook, T. H. P. Tapscott, A. L. Brice (Hon. Sec.), and two visitors.

FAT LAMB RAISING.—The Hon. Secretary contributed the following paper:—"I wish to bring before your notice the fact that it is possible, with very little trouble, to add considerably to your income by keeping a few ewes and raising lambs suitable for export. We will take it for granted that Merino ewes are kept, as they are always obtainable and can be relied on to produce a heavy and profitable fleece. Then comes the question, 'What breed of ram are we to use to get the best results?' In this State there are six breeds that are well known, each having a section of admirers. The Southdown is a smaller but similar sheep to the Shropshire, the lamb being an ideal shape, and growing slightly faster than the Shropshire lamb. In my opinion the Dorset Horn is a better ram in this respect than either of the two previously mentioned, as the lambs mature sooner, and can be placed on the market while the prices are high. Dorset rams can be put with the ewes a fortnight later than Merino rams, and the lambs are ready for market before the Merinos; this also applies to a lesser extent to the Shropshire and Southdown. In the matter of tailing, I am in favor of using the searing-iron in preference to the knife. The iron does not cause the lambs to bleed, as they do when the knife is used, and they are therefore less apt to receive a check in their growth, which is important when it is necessary to have them ready to send away as early as possible. Lambs should be tailed when about three weeks old. Older lambs feel the effects more than the smaller ones. I have heard it stated that the stump of the tail does not heal as quickly when the searing-iron is used. I have watched carefully, but could not detect any difference. It is a good plan to change the sheep from paddock to paddock fairly often. It is more advantageous to have a number of small paddocks than to have one large one of similar acreage. Sheep should always be allowed access to water, from wells in preference to dams, and if the water is slightly brackish it is better for them than rain water. If a farmer has 200 well-woolled Merino ewes, and raises lambs for export, I do not see any reason why the ewes should not produce an average of £1 each annually, including the value of the lamb and the wool. This year, on August 17th, I weighed five lambs, aggregating 344½ lbs.; on September 5th they were again weighed, and this time they totalled 411½ lbs., a gain of 67 lbs., or an average of 13½ lbs. in 19 days. The best of these lambs weighed 76 lbs. on August 17th. It was shorn on September 16th and weighed again on September 19th; it then reached 100½ lbs., a gain of 24½ lbs., and allowing 4 lbs. for weight of wool to be added, making a gain of 28½ lbs. in 33 days. This will show how rapidly a lamb can mature under favorable conditions. I have made no comment on the Leicester, Lincoln, or Romney Marsh rams, as I have had very little experience with them, but the first two breeds appear to be suitable for lamb production, judging by the number who advocate their claims. In conclusion, I hope this paper may be the means of inducing you to seriously consider the advisableness of raising a few suitable export lambs, even if only half a truckload."

Quorn, October 26.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. R. Thompson (chair), Noll, Finley, McColl, Bury, Schulze, Cook, Brewster, and Patten (Hon. Sec.).

SELECTION OF SEED.—In a paper on this subject, Mr. McColl drew attention to the importance of carefully selecting wheat for seed. It was well known that wheat deteriorated if care were not taken with the seed, and it was also known that the yielding quality could be improved by selection. Farmers should do something for themselves in this direction, and he recommended them to select hardy and drought-resisting wheats for the purpose of testing and improving the yields. As a general rule, there was insufficient experimenting done by the farmers of South Australia. Members generally agreed with the views expressed by the writer, and the Chairman stated that if they sowed inferior seed they could not expect to reap first-class wheat. Mr. McColl, in reply to questions, said it was advisable to select the best heads from the plots sown, and sow these again at the following seeding.

Willowie, September 30.

PRESENT.—Messrs. T. Hawke (chair), E. S. Bristow, S. C. Greig, W. B. Bull, A. R. Wilkin, F. Richter, A. W. Howard, L. Hughes, E. J. Kentish, S. Tucker, A. Gray, D. McCallum, W. P. Foulis (Hon. Sec.), and two visitors.

REVIEW OF CONGRESS.—At the conclusion of the report given by Mr. W. P. Foulis, who was one of the delegates, some discussion took place concerning barley-growing for this district. Several members had known barley to be successfully grown in this locality, but the trouble was it became a nuisance in the wheat crops. Members were divided in opinion as to whether barley would stand the drought better than wheat. Mr. Howard mentioned in respect to the feeding value of barley that it tended to fatten stock, while oats helped more in the formation of muscle. Mr. McCallum commented upon his visit to the Roseworthy Agricultural College and Experimental Farm. He considered that the Government experimental farms were of very great benefit to the State, as they were able to carry out research work, which would be too expensive for private individuals to undertake.

Willowie, October 22.

PRESENT.—Messrs. B. E. Schmidt (chair), S. C. Greig, A. W. Howard, E. S. Bristow, A. Gray, W. B. and S. Bull, F. Richter, L. Hughes, W. P. Foulis (Hon. Sec.).

HAYMAKING.—The following paper was read by Mr. S. C. Greig:—"The quality of hay which the farmer feeds to his stock has a great deal to do with the work that they are able to perform. Marshall's Hybrid and King's Early wheats are good varieties for hay. The seed should be free from smut, and it is not advisable to pickle it. Land intended for the growth of hay should be immediately rolled after seeding. If this is done, not only is the return per acre higher but the gathering of the crop is much easier on the binder. When it is the intention of the farmer to cut roads around the wheat paddock, these also should be rolled as soon as the seed is drilled in. The crop could then be cut short, and after ploughing a few rounds an excellent firebreak is made. Before taking the binder out each season the bearings should be kerosined, and care should be taken to see that they are all taking the oil freely. The hay should be cut fairly green, especially if it contains a percentage of oats. Where a clean wheat crop is to be cut, it should be left until it has good grain, for it will then be found to turn out heavier. Stooking should be carried out as soon after cutting as is possible, as the sheaves are then more easily handled and the stooks will better stand rough weather. Where hay is left lying during showery weather, in all probability it will be found slightly tainted when dry enough to stook. If the hay is extra green the stooks should be only three sheaves wide, but in the majority of cases the four-sheaf stook will be found most satisfactory. While the stook can be made to any length, it is necessary to keep the sheaves upright. The hay will then stand well, dry fast, and be easy to cart. Great care should be taken that the hay is perfectly dry before stacking. Even the slightest toughness in the centre of the sheaf renders it unfit to be put into the stack. Two weeks after cutting will generally be found soon enough for carting, but much depends on the weather and the class of hay. The most suitable conveyance for carting is the trolley, but where wagons are used a 10ft. by 16ft. frame with end hurdles 6ft. high, straight up, should be used. The frame with sloping hurdles means that too much high pitching has to be done and there is more danger of their breaking. Where the stack is a chain or more long the width should be not less than 7yds., and round corners are always preferable. Old mallee posts or logs make a good floor for the stack. The correct method of building is to back up with the butts out, placing the butt of the second round nearly out to the strings on the outside round, and so on until the centre is filled up. Building in this way makes the stack firm to stand on. When it is being taken down little damage will be done by fowls if a cut is left open, as the heads of the sheaves are nearly all covered. The heart of the stack should be kept well up, especially when nearing the top. At all heights the ends of stacks should be higher than the middle, as they settle out and go down later on. If they are not kept higher at the edges whilst being built, there is a likelihood of their slipping out. The stack should be wider at the eaves than at the bottom, in order that rain may drip clear. When roofing, it is advisable to put the butts out. The roof should consist of a good coat of Gluyas straw straightened out and carefully packed, then covered with wire netting. The straw should be mowed and handled in cool damp weather, as after it is broken down with the chain or with the harrows it will not run the water off so freely. The weights for holding the netting on the roofs should not be too heavy, as they will in all probability cause the roof to be uneven. Stacks as a general rule should

be built north and south, as when they are placed in the other direction little sun shines on the south side, and there is a tendency for the wheat to germinate in the winter months." In discussing the subject, Mr. Schmidt expressed the view that stacks of about 5yds. wide were most suitable, as there was less danger of the hay being damaged. The centre of the stack should be kept 2ft. 6in. higher than the edges: the butts should be placed out when roofing, as the heads of sheaves rotted very quickly and damaged hay was the result. Straw for covering stacks should be cut with the mower, and straightened out when being placed in position. Mr. Hughes had satisfactorily thatched a stack with sheaves cut with the binder. Mr. Gray did not believe in leaving the crop until the grain was firming, but preferred cutting it just after the bloom had fallen off. At this stage there was more sugar in the hay, and the stock did better on it. He preferred the narrow stacks, as there was less danger of their taking in water. Mr. Howard suggested that sheds with iron roofs were an advantage where hay was grown extensively, as the iron would be found to last for a considerable time and it provided excellent protection. Mr. Bristow thought more care should be taken in stack building, and he advocated the round end, as stacks built in this shape were easier to roof and were not so liable to slip. Mr. S. C. Greig in reply, gave his opinion that horses thrived better on hay cut when the grain had slightly firmed.

CORRECTION.—A paper printed under the heading of "Fencing" in the October issue of the *Journal*, which was attributed to Mr. E. J. Kentish, was written and read by Mr. E. S. Bristow, to whom it should have been credited.—[Ed.]

Wirrabara, September 28.

(Average annual rainfall, 30in.)

PRESENT.—Messesrs. E. J. Stevens (chair), W. H. Stevens, W. Marner, C. Hollett, P. Lawson, P. H. Hockridge, R. L. Watson, J. Kendrick, A. E. Stott, J. F. Pitman, C. F. H. Borgas, H. Lawson, C. H. Curnow, P. J. Curnow, E. Hollett, J. Hollett, A. R. Woodlands (Hon. Sec.), and one visitor.

POULTRY.—Mr. W. H. Stevens read a paper on this subject. The best laying breeds, he said, were the White and Brown Leghorns: the Golden and Silver Wyandotte and Black Orpington (which was also a good table bird) were considered about the best for farm requirements. The best table birds were Plymouth Rock, Buff and White Orpingtons, Minorcas, Dorkings, and Brown and White Brahma. The most desirable time for hatching chickens was about the end of October or in early November, and iron houses were advisable, as less trouble was then experienced with tick. A good preventive measure for this pest was scalding the roosts and woodwork of the houses with a solution of 10 parts soap-suds and one part kerosine. His recommendation for the farmer was to cross a laying strain with table birds, the progeny being a suitable farm fowl. In the discussion which followed, members generally favored the White Leghorn: the Brown Leghorn being regarded as a good utility bird. The Plymouth Rock was recommended as a brooder, and a good all-round bird was the result of a cross between White Leghorns and Black Orpingtons.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, September 28.

PRESENT.—Messesrs. A. H. Jacobie (chair), Burton, Bartrum, Ryan, Curtin, Woolford, C. Cox, F. Bartrum, (Hon. Sec.) and two visitors.

VARIETIES OF WHEAT FOR DISTRICT.—Mr. A. Woolford read a paper on this subject, in which he stated that his experiments had shown that it was necessary to work the land to a fine tilth for success in wheat-growing. The soil must be studied in order to ascertain its capability to grow different varieties of wheats. Federation did well on most soils, but gave the best results on red sandy soil, not too wet. For the wet sandy soil and lime-

stone patches of this district he found that Yandilla King and Steinwedel did best. They kept a good color and were not particularly subject to takeall. Steinwedel should be sown at the rate of about $1\frac{1}{2}$ bush. to the acre, as it did not stool so well as some varieties. For this district early wheats were most satisfactory, and Golden Drop was the best of the early wheats. It grew quickly and matured about three weeks earlier than most other varieties. It yielded well and made good hay, but if sown very early was apt to go down. Comeback did very well, but Comeback No. 6 was better, as it did not shake out so badly. Carmichael's Eclipse was a good wheat to sow late. It stooled and grew very well. King's Early did not stool very well, but being a quick grower was a good variety to sow on dirty land. Baroota Wonder was a good variety to sow in a dry year, but it was very susceptible to red rust. The land in the district varied so much that it was necessary to study the nature of the soil for the wheats. He believed in harrowing after the drill— $1\frac{1}{2}$ in. was deep enough. In the discussion which followed members generally considered that Federation was subject to more diseases than other varieties. It was agreed that it was not as good a variety as when first introduced.

Gladstone, October 26.

PRESENT.—Messrs. R. Lines (chair), J. H. Sargent, Brayley, Hollitt, Sampson, T. Mutter, F. Mutter, Peters, Odgers, G. Fisher, Sando, Anderson, T. Brown, Aughey, Blesing, Masters, O. P. Lines, Eley, J. Fisher, J. Page, R. Coe, A. E. Dinning (Hon. Sec.), and one visitor.

CARE OF HORSES.—In an interesting paper on this subject, Mr. R. E. Lines stated that the best horse for the farmer in South Australia was that which he called a second-class draught. The high-class draught animal was usually too heavy and slow for the average farm work. For road work it was a very fine animal, but as three-fourths of the farmers' work consisted in cultivation, &c., it was better for him to have the horse best suited for this work. To keep up the class of animal it was essential that only the best sires should be utilised. As to feeding, he recommended good long hay placed in a roomy manger, but when the work being done was hard the feed should consist chiefly of chaff, with the addition of corn and bran, and oats in the summer when the weather was warm. Wheat or barley had a tendency to cause sores to break out on the shoulders. The animals should be provided with a roomy stable opening towards the north-east, the other sides being closed in, and plenty of yard room and drainage allowed. It was a mistake to tie up horses in the stables. Spring water was preferable wherever procurable, and he was not in favor of turning the animals out on every occasion when there was no work being done, such as on Sundays. It was better to feed them well in the stable, and so keep up their condition. Mr. Sargent, in discussing the subject, said that horses would eat long hay in the summer with more relish than they would in the winter, as it was more brittle and easily chewed. Mr. Peters did not think salt was necessary, especially if spring water were supplied for drinking. The practice of feeding long hay at night, when the horses had plenty of time at their disposal, was strongly recommended by Mr. Brayley. In reply to questions, Mr. Lines expressed the view that molasses was not necessary as an addition to the horse's ration.

Mount Bryan East, October 21.

(Average annual rainfall, $15\frac{1}{2}$ in.)

PRESENT.—Messrs. J. Thomas (chair), J. Doyle, W. Quinn, T. Quinn, H. and F. Tralaggan, Hughes, C. and G. Dare, F. Thomas, Gare, B. and W. Dunstan, P. Griffin, L. and B. Webber, R. Thomas (Hon. Sec.), and 20 visitors.

WOOL CLASSING.—Mr. Henshaw Jackson, the Wool Instructor, visited the district and gave a practical demonstration before a large attendance of woolgrowers at Messrs. Thomas and Gare's woolshed, kindly lent for the occasion. Several sheep were shorn, and the fleeces were skirted and classed. The advantages to the grower and the advantages to the woolbuyer were explained. The demonstration was of an enthusiastic nature, and great interest was taken by all present. In the evening Mr. Jackson delivered a lecture, which was also well attended.

North Booborowie, September 3.

PRESENT.—Messrs. Ashby (chair), W. Giles, Hannaford, Sullivan, Tall, Smart, Morgan, Roberts, Dunstan Simpson (Hon. Sec.), and one visitor.

FRUIT-GROWING.—Two papers on this subject were read. Mr. W. Giles said—"Land for fruit-growing should be well fenced with four plain wires and 3ft. wire netting to protect the young trees from hares and rabbits. It should be thoroughly broken up to a depth of at least 12in. or 15in. The subsoil should be broken through in sinking the holes in order to allow the roots to go down, and also to allow any water that is likely to accumulate to drain away quickly. If the land is wet, or water has a tendency to lie about on it, underground drains should be put in. The greatest care should be taken that the bud or the last working in the nursery is not covered with soil. Especially should this be watched in the case of apple trees. Apple trees are worked on blight-proof stocks, but the different varieties of apples are not blight-proof. Stone fruit trees do not need to be planted so far apart as is necessary with pears, apples, &c. The septuple system of planting is the best to adopt. The trees are then straight all ways, which means a great deal in the cultivation of an orchard. For home use I would suggest planting Cleopatra apples for eating, cooking, or jelly; Jonathan, for eating; Gravenstein, Rome Beauty, and Dunn Seedling for general purposes; and there are many others that could be mentioned. With pears, Duchers are best for eating, and Vicar of Winkfield for eating and cooking. The trees need to be pruned hard during the first two years to allow of their making roots. They must not have too much top for the roots. I would suggest cutting back to at least the third or fourth bud at the first pruning. Always be careful to prune to an outward bud to encourage the tree to spread out. In the case of a low limb, prune to a top bud in order not to encourage the limb to go down. Cut the centre limb out and so keep the tree open." Mr. W. B. Ashby's paper read as follows:—"One of the most important matters in connection with the successful planting of a garden is that each fruit should be planted on ground suitable to that particular variety. Apricots, peaches, nectarines, cherries, etc., should, as far as possible, be planted on a loose deep ground with good drainage underneath, or on limestone ground. I have found that in a tight ground with clay subsoil a great percentage of the trees die, and those that survive the wet and cold seem to bear very light crops of fruit more subject to disease. The apple, pear, plum, quince, and suchlike, seem to thrive best on the stiffer land with clay subsoil. Pears, in particular, of the very best quality have been grown on poor gravelly ground. For citrus trees I prefer very deep loam with good drainage; but I have seen them thrive and bear very heavy crops on limestone ground where there is a good depth of soil on top. Provided the ground is deep enough, I would give it a good ploughing to a depth of from 8in. to 10in. during the winter before planting to get plenty of moisture into it. The best and cheapest method for planting is to strike the land out with a plough and throw the furrows out to a depth of about 6in. when coming back with the plough. Then get a piece of No. 10 wire, about 1ch. to 1½chs. long, and at every 15ft. place on it a piece of very thin wire. Stretch the wire at right angles across the furrows, and each piece of small wire should hang over the middle of a furrow where the tree or vine should be planted. Spread the roots well around and place earth well over them; then press it down with the feet: fill to ground level. After planting one row, shift the wire on another 15ft., and so on till finished. The best time to plant in this district is July. Select good medium-sized trees. To prune young trees, cut them off about 15in. from the ground, as it is important that they should be low to prevent damage from wind, neither are ladders required to gather the fruit. This will leave the crown or main limbs about 12in. from the ground. They should be thinned out to four, and next season cut back to about 10in., the two top buds being across; this will give eight main limbs. Next season cut back similarly, which will give 16 main limbs, which is sufficient. Cut these back to a reasonable length, and for apples and pears spur prune to two or three buds. A well pruned apricot or peach should resemble an umbrella; an apple or pear, a wineglass. The transplanting of citrus trees should be done when the trees are becoming active, either in the spring or autumn. Great care should be taken in removing them from the nursery. It is best to have a ball of earth covered with a piece of bagging around the roots. Place the tree into position before removing bagging, and do not disturb the earth. Gently press the soil around it, then water. After the water has soaked away, fill it up to ground level. The best time to prune is in the spring. Paint all cuts over ¼in. thick." Mr. Roberts drew attention to the fact that Messrs. Giles and Ashby, who come from Clarendon and Clare respectively, each advocated severe pruning. He was doubtful whether severe pruning would be suitable for this district, as his experience was that in the north it

frequently killed the trees. The opinion was expressed that it was essential to plough the ground deeply and to keep it well worked; also that large holes in which to plant trees were unnecessary.

North Booborowie, September 28.

PRESENT.—Messrs. Ashby (chair), Canny, McColive, Roberts, Schaefer, W. C. and F. C. Catt, Hannaford, W. and A. S. Toll, Morgan, Warner, Smart, McQuillan, Mayfield, Dunstan, Clark, A. V. Simpson (Hon. Sec.), and seven visitors.

FALLOW.—Mr. A. S. Toll read a paper on this subject, in which he stated that to obtain a good yield of wheat it was necessary to thoroughly cultivate the fallow. The first ploughing for fallow should be about 4in. deep. The two principal reasons for fallowing were to eradicate all weeds and to conserve moisture. Fallowing in this district should be commenced as early as possible in June, and should be completed early in September. Before the fallow had time to set it should be harrowed twice, or if possible three times, with set harrows. The land would then be fairly fine on top but would not have the necessary depth of tilth. The weeds would have commenced to grow by October, and the fallow should then be cultivated to a depth of 2½in. but not more than 3in. He preferred the paring plough for cultivating, as it turned the soil well, cutting and turning the weeds, leaving no hollows or tire dragging ruts. After cultivating the fallow should be cross-harrowed twice. The land would then have the necessary fine tilth on top and would have a firm subsoil. Sheep should be allowed to run on fallow in order to keep down any weeds that might grow. Fallow should not be worked during the summer, but it was advisable to harrow after rains in March and April. If the fallow were cloddy it should be rolled and harrowed at this period. The fallow should be harrowed whenever possible after rain. In the discussion which followed several members were of the opinion that new land in this district should not be ploughed more than 2in. deep, while other members favored ploughing to a depth of 4in. Mr. Hannaford mentioned a case where 4in. ploughing, properly worked, had produced far better results than 2in. ploughing. In reply to a question Mr. Toll stated that under no circumstances should fallow be worked during December, January, or February. Several members, however, favored working fallow at any time in the summer after a good fall of rain.

Port Broughton, October 25.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. C. E. Pattingale (chair), W. R. and H. P. Whittaker, T. E. Pattingale, R. Hill, B. Donnelly, W. Excell, D. and E. Allchurch, G. H. Rantley, and J. H. Fletcher (Hon. Sec.).

TAKEALL.—Following the reading of an article on this subject, an interesting discussion took place. It was remarked that takeall was not so prevalent this year as was usually the case, which was attributed to the unfavorable weather conditions to the growth of the fungus. Mr. G. E. Pattingale described the shape in which the patches of this fungus generally developed. In rubbly soil it had a tendency to long strips, while on drift sand it generally appeared in the whitehead form.

MORTALITY AMONG BROOD MARES.—Mr. G. E. Pattingale drew attention to the fact that there was more trouble with brood mares in dry seasons than was otherwise the case. It was generally found that the foals made abnormal presentation, in the majority of cases being upside down. Three members of the Bureau had lost mares this year, and in each case it was found that the foals were dead when the mares were first noticed to be out of normal condition.

Redhill, August 27.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. McAvaney (chair), Stone, D., E., and B. Steele, Hayes, Trowren, Treloar, Button, Dick, Holmes, Briggs, Pengilly, F. and F. A. Wheaton (Hon. Sec.), and three visitors.

MOTOR POWER ON THE FARM.—Mr. Trowren, in a paper on this subject, stated that farmers were beginning to see the advantage of engines for different farm work, such

as chaff-cutting. Gasolene engines were generally considered the cheaper and handier. With the oil engine it was necessary to heat it before commencing, and if it became necessary to sharpen the knives of the chaffcutter, or to stop for a few moments for any other reason, it entailed letting the engine run empty or keeping the lamp burning. On the other hand, the gasolene engine was always ready to commence work. Work could be stopped without any waste of fuel or time. Generally, to drive a four-cutter and elevator a 6-horsepower oil engine was required, whereas a 4-horsepower gasolene engine would do the same work. The gasolene engine which the writer had was capable of cutting from 12 tons to 14 tons of hay on 4galls. of fuel, which was equal to about 5d. per ton. Where the country was suitable the use of tractors was advisable, and here again the gasolene engine was the best. The oil engine lost its power when it became overheated; on the other hand the gasolene engine worked better the warmer it became. In addition there was no bare flame, the engines were cleaner, and generally did their work better. Continuing, the paper said: "Kerosine gives off a lot of smoke which cause the valves and combustion chamber to become clogged. These have, of course, to be cleaned. Our engines have very seldom to be cleaned for this reason. We have taken the piston and valves out, but they have needed very little attention. The strength of our engines is obtained from the great length of the cylinder and the narrow space for combustion. Power is obtained from the combustion of an explosive mixture of gasolene and air automatically admitted into the cylinder. The requisite compression having been obtained, the mixture is ignited by a spark from the battery or magneto, and the impulse of this explosion furnishes the power to drive the piston connected with the crank. Our engines are what are known as four-cycle engines. In the operation four strokes of the piston are required to first draw in a charge of fuel, secondly compress it, thirdly ignite it, and fourthly discharge. We plough with the tractor at a cost of 2s. 9d. per acre. This is very little cheaper than horses, but the advantage of the tractor is that there is no extra expense while it is not working, and it does not require so much labor. Of course, these engines are not perfect, but the time will come when all work will be done on the farm with electricity." In discussing the subject, Mr. Stone expressed the view that tractors would be very popular for farm work in the course of a few years. Mr. Pengilley thought the practice of using tractors on the farm would be inimical to the interests of the horse-breeding and chaff industries, and he opposed them on this ground. Most members were of the opinion that a 20-horsepower tractor would not do the work of 20 horses, with which Mr. Stone disagreed.

Redhill, October 1.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. McAvaney (chair), Button, Kelly, Pengilley, Holmes, T. A. Wheaton (Hon. Sec.).

FARM HORSES.—Following on the report of delegates to Congress, members discussed the paper on farm horses, read by Mr. W. P. Foulis. Members generally agreed that the type of horse advocated was too large for farm work, and the smaller type was fast coming into prominence. Members thought the Suffolk Punch would be used more in future. Other matters brought up at Congress were discussed, and it was decided to put into operation a few suggestions made by the Secretary of the Advisory Board for the better working of the Branch.

Spalding, October 18.

PRESENT.—Messrs. E. E. Gill (chair), G. Thorn, D. Work, A. B. Jones, P. H. Gill, W. Hacklin, J. H. Pluckrose, and two visitors.

FALLOWING.—This subject was dealt with in the following paper by Mr. P. H. Gill:—"Most farmers find it most convenient to begin fallowing as soon as seeding is over. The way in which the paddock is worked depends a good deal on the shape and contour of the land. It is best to have the lands or pieces as long as possible and the same width each end, to prevent short work and much turning, as this not only tires the team but takes much more time. If the land is on a slope I would advise fallowing the highest ground first, so that the water is held from running off the hill sides on to that already fallowed, causing it to become boggy. Where possible it should be fallowed along the slope, to avoid creeks or gutters. The depth to fallow is one of most important questions and is worthy of much discussion. Some farmers fallow deep, some to a medium depth,

while others only scratch the ground. Each one seems to be able to put forth plenty of arguments to suit his own peculiar way. The depth depends considerably on the class of soil; that which suits one place may not suit another. I am of the opinion that in this district no ground should be fallowed to a less depth than 4in. or more than 6in. Between 4in. and 5in. is best, but nothing less than 4in. Only that area which the farmer is able to work well with harrows and the cultivator before harvest time should be fallowed. A great many farmers pay too much attention to quantity and neglect the quality. This is a great mistake, because frequently 250 acres of well-worked fallow and properly-tilled land will produce more wheat than 400 acres of neglected fallow and badly put in ground. This question is worthy of consideration. Remember the high price of land, the extra seed and super., and the extra quantity of land to be gone over with the harvester, to say nothing of the land becoming dirty. Some farmers are very much against doing anything to the land after fallowing more than harrowing and feeding it off with sheep, and they claim to grow as much wheat per acre as those who use the cultivator. This method may answer in some districts, but after practising both ways I have come to the conclusion that the more work the fallow gets the better. After finishing fallowing, say at the end of August, apply harrows; or the clod crusher, if necessary, should be put over to level it. Then graze with sheep to check the weeds; remove all loose stones, cultivate across the furrows if possible, and if time permits again cross cultivate. Have good fallow well worked, the very best graded seed procurable, give it a good dressing with super., say between 80lbs. and 100lbs. to the acre, and till carefully, after rain if possible." In discussing the paper Mr. Thorn emphasized the necessity of fallowing early. Five inches was the most suitable depth. Mr. Work thought the time to fallow depended on the nature of the soil and the strength available for working it. Where red land was cultivated to too fine a tilth after heavy rain the surface would set too hard for a good growth. Mr. A. B. Jones believed repeated harrowing was beneficial. Weeds should be kept down well and heavy dressings of super. applied at seeding time. Mr. W. Hacklin thought that while black loam improved with working, too much cultivation was not good for red soil.

Whyte-Yarcowie, September 23.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. G. F. Jenkins (chair), G. A. Wittwer, J. E. and F. Hunt, A. Mitchell, G. R. and J. Mudge, S. Robinson, W. Mudge, J. McLeod, J. Faulkner, E. Travers, F. Lock, J. Walsh, E. J. and F. Pearce (Hon. Sec.), and two visitors.

CLEANLINESS IN DAIRYING.—Mr. G. A. Wittwer read an extract dealing with the use of separators from the *New Zealand Farm and Stock Journal*. The construction of well-ventilated separating houses was urged. Cream cans without seams were recommended, and the necessity for thorough scrubbing and scalding was emphasized. Mr. Wittwer then expressed the opinion that more strict supervision was needed among the dairymen, particularly to bring about greater cleanliness in the use of separators and butter-making generally. Several instances had come under his personal notice in which the product of the dairy, which the storekeeper for business reasons was practically compelled to take from his customers, were far from clean, and in some instances were quite unfit for human consumption.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Blyth, October 19.

PRESENT.—Messrs. A. L. McEwin (chair), J. S. McEwin, C. H. Zweek, M. Coleman, J. C. and A. S. Schulze, W. J. Ninnos, R. Buzacott, C. Lehmann, S. G. Shepherd, M. Williams, D. Crawford, jun., J. B., F. A., and A. B. Kirchner, J. and T. Williams, H. Neumann, H. A. Montgomery, J. Kostera, E. C. Deland, W. O. Eime (Hon. Sec.), and five visitors.

HORSE-BREEDING SOCIETIES.—This subject was dealt with in a paper by Mr. E. Lehmann, in the course of which he stated that the introduction of the proposed horse-breeding societies' scheme should result in a considerable improvement in the quality of the horse stock in this State. It should be a means of inducing owners to introduce first-class stallions from the eastern States and New Zealand. The Branch decided to discuss the matter fully at its next meeting.

Freeling, August 28.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. A. J. Kuhlmann (chair), F. H. Heinrich, J. T. Elix, A. Elix, Neindorf, Savage, A. Anders, Noske, Gramp, Morris, M. Shanahan, W. Schuster, J. Kuhlmann, G. A. Block (Hon. Sec.).

A MODEL POULTRY FARM.—The meeting was held at the homestead of Mr. F. H. Heinrich, and an inspection of the model poultry plant was made. Mr. Heinrich put up the plant 18 months ago. After some trouble he secured a competent manager, and he believed he would be able to say at this time next year that the business was profitable. Poultry-farming, like any other business, required any amount of energy. The most important factors were good housing, feeding, watering, and cleanliness. Greenfeed during the summer was particularly desirable, and in order to obtain this a good supply of water was necessary. Farmers, by paying a little more attention to poultry and working on the proper lines, could increase the income of the farm very considerably.

BERSEEM.—A plot of about three-quarters of an acre of Berseem (Egyptian clover), the second growth, was inspected. Mr. Heinrich spoke very highly of this as a fodder for poultry and cattle. He mentioned that the stem was so succulent that the poultry ate that as well as the foliage.

Freeling, September 28.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. A. Kuhlmann (chair), A. Elix, G. T. Elix, J. Kuhlmann, E. Morris, W. Schroder, H. Kohde, Ch. Dahlenburg, and G. A. Block (Hon. Sec.).

WHEAT AND OATS FOR HAY.—This subject was dealt with in the following paper by Mr. A. Kuhlmann:—"For 19 years I have carried on farming in this district with a certain amount of success, due, no doubt, to the application of improved methods of farming. During the greater part of this period I have tried various experiments in regard to pickling, depth of sowing, methods of tillage, in altering farming implements, and mode of sowing. My present method of farming is to crop half of my land every year. The whole of the other half, except 11 acres, is under fallow. I believe in fallowing early in order to give the land as long a spell as possible. The depth of ploughing is about 4 in., but soon after this operation the land is harrowed at right angles to the ploughing and then scarified across the ploughing. The workings are repeated when occasion arises, but soon after Christmas the fallow is skimmed with a scarifier especially made to my order. It is of great importance that the scarifying about this time of the year should be shallow, in order to kill the weeds, but prevent the moisture in the land escaping too rapidly. Near the end of March, irrespective of weather conditions, the land is once more scarified, or chisel-harrowed, and the manure, lewt, to the acre, is drilled in. This should never be done too early in the season; not more than three or four weeks before the wheat is sown, because the weeds that grow before the wheat is sown will feed on the manure, to the detriment of the wheat. During April or May, according to the suitability of the season, the all-important operation of sowing the wheat and oats takes place after the fallow has for the last time been scarified very shallowly and harrowed. When sowing I remove all the tines from the drill and only leave the tubes. The wheat does not fall in drills but is more scattered, especially on windy days. Thus it is more evenly sown and each grain has more room to stool. There is less danger of the crop suffering from smut, and the grain does not come in too close contact with the manure. The whole crop is cleaner and almost free of weeds, because there is little room for the weeds to grow, and finally the yield is much heavier than when the seed is sown with tines on the drill. When the wheat is sown with the manure through the drill there is more trouble with smut. Shortly after the sowing is completed the land is rolled. One hundred acres are rolled in one day by a single team of horses. Although this seems too much for the horses, it is not so in the way I work them. I couple three rollers 11 ft. wide,

and these are kept moving for the whole day without a stop. I roll with six horses for some hours, then three of these horses are released and fed and three fresh horses take their places. This is repeated during the whole day, and while the man in charge of the team in the morning has his dinner another man takes his place. The soil is in perfect condition now, for it has been four times scarified, three times harrowed, and rolled. The wheat as well as the oats which is sown is most carefully graded and freed from all foreign matter and seeds. Only large plump grain is selected. I do not believe in sowing one kind of wheat only, but after experimenting with many I find that the five following varieties the best for hay, viz. :—Baroota Wonder, White Tuscan, Leather Head, Majestic, and Le Huguenot, and one kind of oats—Calcutta Cape. I sow one-third of every paddock put in crop with oats; the next third is sown with oats when the paddock is in crop again, and the last third at the next sowing. I find that wheat which follows a crop of oats yields one-half to three-quarters of a ton of hay more than if it follows wheat again. In order to make the oats stand up better I add $\frac{1}{2}$ bush. of wheat per acre and mix it with the oats seed. When experimenting with 'rotation of crops,' I observed regularly that wheat sown on land where barley had been one or two years ago yielded a much inferior crop. The difference was as much as one ton of hay to the acre, or even greater. I have averaged a yield of $2\frac{1}{2}$ to 4 tons of hay to the acre for years. Even the last season's crop averaged 2 tons, although it had been rather dry and otherwise unfavorable to the production of a heavy crop. I keep just as much stock on my land as other farmers, and know how to keep them in good condition with less hay from the stack than others do. For this purpose I have reserved 11 acres of land which is cropped every year. This piece of land is well manured with stable manure and superphosphate, and sown with equal quantities of barley and wheat in March, or as soon as the first rains come. It gets an early start, and by the time the last of the following is done I have good feed for my stock till harvest time." Members generally agreed that the varieties mentioned by the Chairman were suitable hay wheats, but they were not heavy grain-yielding kinds. Mr. W. Schuster expressed the view that Marshall's Prolific was one of the best hay sorts.

Freeling, October 25.

(Average annual rainfall, 17 $\frac{1}{2}$ in.)

PRESENT.—Messrs. J. A. Kuhlmann (chair), Neldner, Aug. Mattiske, sen., H. Mattiske, jun., Theo. Elix, W. Neindorf, H. Koch, M. Shanahan, John Kuhlmann, F. H. Heinrich, G. A. Block, (Hon. Sec.), and one visitor.

SELECTION OF SEED WHEAT.—The Hon. Secretary gave the following paper :—
 "The Government recognises the value of the Agricultural Bureau to the State, as is shown by the encouragement it gives to farmers to form new branches. Questions of importance to farmers are referred back to the Branches for report, and much valuable information is collected thereby. Naturally we question ourselves as to how we can still further improve the usefulness of the Agricultural Bureaux. My answer thereto would be to devote more time to experimental work. In all different branches of human knowledge experiments are continually carried on; very often grave mistakes have been made, but without these experiments there would have been no progress. The same applies to agriculture, and I am sure each farmer can give a whole list of the mistakes he has himself made, such as planting the wrong varieties of trees or vines, keeping the less profitable breed of sheep, pigs, or poultry, sowing varieties of wheat affected with rust when he should have sown rust-resisting wheat, or putting in wheat that will not stool or kinds that will shake. In this paper I am going to confine myself to improvements in seed wheats, and how they should be effected through the different Branches of the Agricultural Bureau. During the last few years such work has been carried on at Roseworthy and at Parafield, and a number of farmers have been taking it up on their own. Much good has been done by selecting from known varieties as well as introducing new ones, but a great deal more can be done by members of the Bureau. The main point is to get our farmers interested in the work. My suggestion is to give prizes for the best 30 or 50 heads of a known or unknown variety; special prizes might be given for the best and largest head of wheat. This matter might be taken up by the teachers of our schools, and besides the possibility of growing new varieties, it would be the means of giving the children an interest in agriculture. The different varieties could be then numbered and judged by a competent judge, the Branch taking possession of the wheat and making arrangements with some farmer to sow the different sorts side by side. After that results could be watched and new selections made at

harvest time. The prize-money could be paid out of the funds of the different Branches. Now if the 140 Branches we have in the State were to take up this matter in the way I suggest, results would certainly be very satisfactory. Members may say these experiments are now carried on under the supervision of experts, but nearly all new varieties of wheat have been introduced by different individual farmers. Then again farmers may say there is nothing new in this suggestion: it is now carried on at Balaklava under the auspices of that Branch. But at Balaklava the competitors commence with a quarter acre, while I suggest, if there is no more available, commencing with a single head. There each one sows on his own ground; one farmer may sow an early variety, another a later one. One may use more super., the other less." Mr. Heinrich, in discussing the subject, expressed an opinion in favor of hand selection, which, he said, was being satisfactorily carried out at Roseworthy. Mr. Neindorf was in favor of individual farmers doing more in this direction, in which he was supported by Mr. Elix, who had selected from a single head a variety which had proved very satisfactory.

Greenock, September 27.

PRESENT.—MESSRS. A. Heinze (chair), R. Tümmel, Geo. Tümmel, L. Tümmel, J. C. Jaensch, A. Nitschke, B. Nitschke, W. F. Nitschke, H. Koch, E. Handke, C. Liersch, O. Semmler, E. Geyer, O. Krüger, W. Rönfeldt, E. Rönfeldt, W. B. Teebo, P. Kernich, S. Listner, W. Nenke, V. Koschade (Hon. Sec.).

THE PRODUCER AND PRODUCTION.—This subject formed the title of an interesting address by the Hon. Secretary. Attention was drawn to the necessity of imparting a thorough education to those who were to be the producers in the course of a few years, and due emphasis was given to the benefits derived from the application of scientific knowledge to agricultural problems.

Riverton, October 15.

(Average annual rainfall, 20½ in.)

PRESENT.—MESSRS. J. P. Schultz (chair), R. H. Cooper, R. Wilkinson, E. Johnson, W. Moss, W. B. Davis, R. J. James, H. A. Davis, J.P., J. W. Kelly, F. Phillips, and E. A. Gray (Hon. Sec.).

DOUBLE MANURING.—This subject was dealt with in the following paper by Mr. R. Wilkinson:—"The whole science of manuring plants is, to provide suitable food in a form available for their nourishment. A wrong impression exists regarding manures, i.e., that they are all merely forcing mixtures and exhausting to the soil, whereas a complete well-balanced manure feeds and supports the plant, asking nothing from the land except moisture, and therefore cannot injure the land in the slightest degree. It is in applying what is termed an acid manure, such as our every-day superphosphate, which only contains a portion of the required plant foods, that the danger lies. Manures may act in two ways. First—By actually supplying plant food; second—By acting chemically on food already in the ground and rendering it more soluble, and therefore more available to the plant. The former is a true manure in that it takes nothing from the land; the latter leaves it poorer than before. It is not enough to know that plants require certain substances, such as phosphoric acid, potash, lime, and others, but it is necessary to understand the proper management of these to obtain the most effective and economical results. To secure larger crops, phosphoric acid, potash, and lime should be used in greater quantities than crops require, but nitrogen, being a stimulant of great power, should be applied in amounts not in excess of the needs of the crop. One would think that in a district like our own where there is a good proportion of dark soil, rich in humus, and consequently containing a fair supply of nitrogen, thorough manuring would not be so necessary as in poorer and drier parts of the State. But the case is just the opposite, as the nitrogen acting on the plant growth as a stimulant must be backed up by a liberal supply of plant foods, unless we are to have a rank growth, deficient in mineral salts, very apt to lodge in bad weather and probably ending in a miserably shrivelled grain. There is a natural law in regard to plant nourishment, providing that no crop can assimilate more than half of the phosphoric acid available in the sod. This is important, in that it means that there must be twice as much available in the soil as the crop can possibly take up. It has been calculated that a 25bush. crop of wheat requires 17½lbs. of phosphoric acid, therefore there must be at least 35½lbs. available as food for the crop. Similarly a 40bush. crop requires 28½lbs., and must have at least an available supply of 57lbs. The question naturally arises, from where is this phos-

phoric acid to come? it being known that Australian soils are greatly deficient in natural phosphates. The answer is—By applying artificial phosphates having a form as near as possible to the natural soil phosphates, which according to the author of the 'A.B.C. of Rational Manuring,' can be done by his system—double manuring. The absolute necessity of phosphates to the human race, also to our stock, for the formation of healthy bone, teeth, and brain, makes the plentiful supply of phosphoric acid in the form of phosphates in the soil an essential to the healthy growth of nutritious grain for ourselves and fodder for stock. The lack of phosphoric acid in our soils becomes apparent when we compare the following figures:—The soils of Australia contain from 350lbs. to 1,100lbs. of phosphoric acid per acre, as against from 3,500lbs. to 4,300lbs. of the Canadian wheat farms, and the 5,200lbs. per acre of the Russian wheat soil. From calculations based upon recognised data relating to soil content, allowing for the replacements by manures applied to the soil, it is estimated that the phosphates in the older land of Australia under wheat will be exhausted in the next 25 to 35 years, unless the present rate of depletion is at once checked. The effects of the employment of an acid manure, such as our ordinary superphosphate which is made by the action of sulphuric acid on the natural rock phosphate, that sets up an acid reaction in the soil, cannot be beneficial, as the healthy and natural action of soils is alkaline. The action of 'super' on the phosphates of the soil causes them to become easily soluble, and thus quickly available to the plant as food. Now if the crop should utilise this increased supply of prepared food, it would represent a larger yield, but unfortunately the wheat plant cannot do this, because for the first two or three months after sprouting its growth is very slow, and thus the winter rains remove this valuable plant food by leaching and drainage, and it is lost to the crop. This waste of soil fertility is the direct outcome of using superphosphate by itself without another phosphatic manure containing lime, as is done by the European wheat-growers. Lime, in conjunction with the superphosphate, will arrest to a large extent the latter's harmful effects, but unfortunately the Australian soils are deficient in lime. The minimum lime contents should be 17,000lbs. per acre, whereas the average content of Australian soils is only 4,000lbs. per acre. The safeguard against the exhaustion of soils is a rational system of restoring to the land all the phosphoric acid taken by the crop in a natural form accompanied by carbonate of lime. With virgin soils sufficient time has elapsed to enable the moisture, air, cold, and heat to store up an available supply of phosphates in the soil against the needs of plants. This explains why the first few crops are as a rule heavy. But the rate of withdrawals of phosphates by crops is much greater than the conversion into available form of the supply by cultivation. In six months a good crop will take up the stored-up supply of six years. Consequently without suitable manurings a falling off of yields is bound to happen, since the available phosphates are being gradually exhausted. Thus, given moisture and humus from which to derive the required nitrogen, the problem of wheat-growing resolves itself into the supply of available phosphate. The double manuring system, according to the originator, is the solution of the manuring difficulty, and will result in crops half again as heavy as we are getting at the present time with only a slight increase of labor and outlay, and by the use of which the soils in years to come will be as productive as they are now. The practice consists of using small quantities, 30lbs. to 40lbs., of superphosphate, with the seed as a starter for the crop, but previous to this the fallow must be dressed after the first harrowing of the ploughed land with another phosphatic manure, preferably a good guano with its slight percentage of organic nitrogen. The quantity of manure to put on the fallow should be sufficient to provide enough phosphoric acid for the full crop desired. Thus a crop of 25bush, requiring 17½lbs. of phosphoric acid must have an available supply of 35½lbs. from which to draw, to supply which a dressing of just under 2cwts. of either phosphatic guano or Thomas phosphate, known as basic slag, will be necessary. These quantities may appear large, but they are nothing out of the way, and are perfectly safe in practice owing to the character of the manures. The working theories of double manuring are: First—That the phosphates in phosphatic guano or Thomas phosphate, being largely citrate soluble, are available for the plant when most needed, and thus allow it to take advantage of any moisture in the soil. Second—In utilising a small percentage of water soluble phosphates a large amount of plant food is reclaimed in the soil, which, had superphosphate been used by itself, would have been lost by drainage, &c. Third—By the presence of lime in these manures the alkaline action of the soil is maintained, the decomposition of stubble and all organic matter is hastened, thus making a valuable humus, which in turn greatly helps in conserving moisture, and lastly helps to kill out weeds, such as sorrel. As far as I know the true worth of this method of manuring has not, in this district at least, been tested. Although I cannot vouch for the practical value of the system, it seems well worthy of a thorough trial."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Maitland, October 5.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Smith (chair), Bawden, Hielemann, Hill, E. G. Jarrett, A. Jarrett, Wundersitz, and Pitcher (Hon. Sec.).

COLT-BREAKING.—The following paper on this subject was read by the Hon. Secretary :—“The best time to break in a young draught horse is at the age of two and a half or three years. The horses should be yarded as quietly as possible, and it does not pay to hurry over the work. A light pole 10ft. or 12ft. long should be used for placing a rope on the animal's neck. Care should be taken that the spare rope is properly coiled, so that it can be handled easily and paid out without any danger of entangling the operator. I prefer a running noose for the neck. When the rope is fixed on the animal's neck the assistant should take one turn round the strongest post available, and by degrees it should be worked up to the post. The colt will probably choke down in its endeavors to get free, but this will do no harm. The next thing is to put on the halter. The rope should be slackened from the post before handling the colt is attempted. One hand should be held before its nostril, in order that it may smell the operator. By this time he will have found out whether the colt is active with its front feet. Having been stroked and patted, a good strong plain bit should be put in its mouth and the rope untied from the post. If the colt is at all wild a reef should be taken through both sides of the bit and put round the neck in a firm knot, and a lighter rope placed on the opposite side to that which the operator is to hold. The collar and hames should then be put on. The operator with the strong rope should lead out of the yard and get the colt to follow him. If dubious, the assistant with the light rope should try very quietly to drive it by throwing the rope over its back and bringing it round his hind legs. The rope can be used for checking the animal if it makes a rush. A piece of well-worked fallow should be selected, as it gives the operator a good foothold. The next procedure is to lunge it. If the beast is willing this operation need not be continued for more than five or ten minutes. The colt should then be drawn towards the breaker. It will soon stand, and it should then be coaxed up to the operator. It may not do this at first, but it will not be a lengthy undertaking. The rope should then be changed from side to side and the colt run round a few times. If it declines, the assistant with the light rope can coax it by putting the rope round its hind legs, which the majority of horses resent. Old horses are liable to get their legs over the chains, and it is therefore necessary to teach the colts to become accustomed to having things about their legs. Before going back to the yard the first lesson in leading should be given. The operator should go ahead and coax, but not pull on the rope. The assistant will start the animal from the rear and gradually fall back as it moves away. The colt will not lead immediately, but will very quickly learn, especially if handled quietly. The first lesson in backing should also be given. If the animal moves one front foot it is quite enough for a start. It should then be taken back to the yard, where a few minutes should be spent in patting and talking to it, and if fairly quiet the gear taken off. If two have been handled in the morning the same two should be handled in the afternoon. A pair of leading chains without a spreader should be obtained. The object of leading chains is to prevent the animal kicking the swing. The animal should be fixed on to a light log in chains, and the operator should go ahead, the assistant keeping behind. Care must be taken to have the ropes neatly coiled. The operator should gradually work behind and keep going if possible for about half a mile. Then stop and loosen all ropes that are jamming the animal's jaw or chafing. It should then be driven as straight as possible and turned first one way and then the other, and turned back quite short, so that the chains rub against its legs. It does not matter if it gets its legs out. It will soon know whether its legs are more comfortable inside the chains or out. Next morning it should be taken out, but with an old and reliable horse for company. They should be yoked up as a pair and given from an hour to an hour and a half exercise on the same lines as when working the colt singly. The third day it should be worked in the team, but always on the near side for a commencement. I prefer separate reins on the colt. After working on the near side for a week or two it should be changed to the off side and taught the use of the reins on both sides. When it has learnt this it may be used in the body, as the case may require. If convenient it should be worked for about two hours for the first few days. The time can then be extended to half a day. If possible it should not be worked for more than half a day for the first season, as the animal is young and tender and requires consideration.” In the discussion which followed

Mr. Heilemann thought the sooner young horses were put in the team the better. He did not believe in wasting a lot of time over them. Mr. Hill always put a colt between two quiet horses and gave it exercise. He then schooled it in the wagon. Mr. Bawden believed in kindness, and considered a closed shed the best place in which to handle a colt. He did not believe in drawing a colt up to a post, as large numbers of colts lost their lives in this way, with which view Mr. Smith agreed.

Moonta, September 24.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. J. Atkinson (chair), H. Fuss, R. A. Hancock, W. F. Ortloff, S. S. Woodward, W. B. Stacey, F. E. and C. Nankivell, T. R. Luke, J. Cooper, T. Laidlaw (Hon. Sec.), and one visitor.

PLOUGHING.—Mr. R. A. Hancock read a paper on this subject, in which he stated that to facilitate ploughing the horses should be yoked as close to the plough as it was possible. This was done by shortening the traces, S hooks, and swings as much as possible, and the spreader bars should also be kept short. This kept the horses close to the work, made the load easier to draw, occasioned fewer sore shoulders, and kept the horses in better condition. For ploughing the first time he advocated going round the paddock with the left hand to the fence, the front body just skimming the ground and the hind body ploughing to the required depth. He would then turn round and plough with the off front wheel of the plough in the furrow made by the hind body, thus filling in the furrow made by the hind body. The hind body would then be cutting the ground at the required depth. This could be done with half the team, so allowing the plough to get close to the fence, and would prevent raising an embankment at the outside edge, which would be found detrimental when rolling and cutting. By commencing the paddocks in this way the land was kept level. He found it easier to keep the ground level than it was to level it after it had been raised in furrows or embankments. When ploughing the paddocks in lands he advocated striking out in the same manner. The plough would then cut all the ground at the crown and would finish with the hind body just skimming the ground, and not leaving a deep finishing furrow, which was never properly filled in. In the discussion which followed Mr. Stacey said he would not keep the horses too close to the plough, as in crab hole and Bay of Biscay ground the longer draught the better the ploughing would be. Neither Mr. Stacey nor Mr. Ortloff would plough nearer than 6ft. from the fence, so that cattle could not reach the crop. If they once learned that trick they became a nuisance. Mr. Hancock would place a barbed wire on the top of fences to prevent cattle reaching over.

Moonta, October 14.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. J. Atkinson (chair), J. Cooper, T. R. Luke, C. Nankivell, H. Fuss, W. F. Ortloff, J. Andrewartha, S. S. Woodward, S. J. Griffin, W. B. Stacey, T. Laidlaw (Hon. Sec.), and one visitor.

FALLOWING.—Mr. J. Cooper read a paper on this subject. The chief value of fallowing, he said, was to liberate the plant food stored in the soil as organic matter. Ploughing and stirring admitted air, which helped to replace the nitrogen taken from the soil by the previous crops. It also destroyed the roots of weeds and converted them into fertilising material and allowed the ground to recuperate. Fallowing should be commenced as soon after seeding as possible. He advocated ploughing to a depth of 3in. or 4in. in this district, but where the subsoil would allow of it 6in. was preferable. He advised ploughing all fallow in two chain or smaller lands, as then the soil was thoroughly worked when cross-ploughed. He would cross-harrow immediately after the first ploughing had been finished. This levelled the surface and checked evaporation of moisture. The fallow could be harrowed after it had been turned back. When the first ploughing had been completed he would take off the mouldboards and set the plough to 6in. or 8in. and then cross-plough. This would stir all the subsoil without bringing it to the surface. Where the soil was heavy he would harrow well, but where it was sandy he would work as little as possible for fear of drift. In the discussion which followed Mr. F. Ortloff said he did not

favor deep ploughing; 6in. was too deep, 3in. being quite deep enough for the soils in this district. Deep ploughing encouraged takeall. In the summer the fallow should only be lightly skimmed in order to just cover weed seeds. A light rain would then cause them to germinate. Mr. S. S. Woodward did not favor deep ploughing. He had fallowed in the summer and had turned it back in the spring, and it gave promise of being his best crop this year. Mr. J. Atkinson believed in taking off the mouldboards and ploughing deep without turning the subsoil. It would then make a better seed bed. Mr. C. Nankivell said that takeall and black rust were more noticeable where the land had been ploughed deep. Mr. J. Cooper preferred the skim plough to the V-shaped cultivator or scarifier for working back fallow.

SORE SHOULDERS.—In a discussion on this subject Mr. J. Atkinson said that when he ploughed in lands of a chain to two chains some years ago he noticed that sore shoulders were not so prevalent among horses as they were with the block ploughing. He attributed this to the fact that the air got between the collar and the animal's shoulder when turning. C. Nankivell considered that farmers should oil their horse collars and keep them clean. The horses should be kept in proper condition and good feed, not too rich, with an occasional bran mash, should be given them. The shoulders should be properly brushed and groomed. If this were done they would not be troubled with sore shoulders. He had teams working all the year round in farm dray and wagon, and there was no sign of sore shoulders on his horses. Mr. B. Stacey said that lack of grooming and badly-fitting collars were not the only causes of this trouble. It was often caused by a microbe under the skin, which if not killed would endeavor to eat its way out, and thus cause a sore. When the lumps, which were a sure sign of the insects' presence, first appeared a strong lotion of sulphate of copper should be applied. This would kill the insect, and thus prevent a sore.

NOXIOUS WEEDS.—Mr. Orloff expressed the view that the wild turnip should be classed as a noxious weed. It was spreading very rapidly, and farmers would experience great difficulty in eradicating it. Mr. B. Stacey said that the Cape tulip, three-cornered jacks, and other poisonous weeds were spreading very quickly in the district. No regard was being given them by the district council or by the farmers generally. The tulip was growing so thickly that hardly any grass would grow near it. The grass that did grow was not fit for stock to eat, as it came into contact with the milk from the tulip. A horse had died quite recently through eating the weed. He considered that a date should be fixed by the Government on which every person should commence destroying weeds. A ranger should be appointed to see that those having noxious weeds on their property destroyed them. If this were done they would soon have the weeds eradicated. It was useless one person attempting to destroy them when perhaps his neighbors allowed them to seed and spread everywhere. The Cape tulip bloomed three times a year. It was dangerous to children, for when picking the flowers they got the milk over their hands, and this was likely to be transmitted to their mouths with disastrous results.

Pine Forest, September 24.

(Average annual rainfall, 13in.)

PRESENT.—Messrs. Attenborough (chair), C. Schultz, S. Barr, R. Goodridge (Hon. Sec.), and one visitor.

CONGRESS ECHOES.—Having heard the reports of delegates to Congress, some of the members decided to try small plots of six-row barley next season. They thought, however, that wheat would not do as well after barley as it would after wheat. Oats were profitable to grow, only in dry seasons they were not good for a hay cut. Members also decided to act on the advice of Professor Lowrie by using the harrows more and the cultivator less, and, where the conditions would permit of it, by ploughing in stubble instead of burning it.

FRUIT AND FLOWERS.—Members inspected the property of Mr. Attenborough, at whose farm the meeting was held, and were much impressed by the success achieved with fruit trees and with flowers in this part of the country, which in earlier years had been commonly called the desert. A useful barn was seen built with stone in the side of a hill, the top storey being used for seed and super., with a platform arranged the right height for the wagon, and the bottom storey being used as a trap shed.

WESTERN DISTRICT.

Koppio, September 26.

(Average annual rainfall, 22·35in.)

PRESENT.—Messrs. G. B. Gardner (chair), J. Newell, T. Brennand, G. and M. Howard, C. Barraud, M. T. Gardner (Hon. Sec.).

EXHIBITS.—Mr. M. Howard tabled samples of three-year-old Chou Moellier root, and also a sample of sea kale. Samples of early-sown field peas were tabled by Mr. Brennan, and late-sown peas were exhibited by the Hon. Secretary. The early-sown peas showed much better growth than the later sown, and members generally agreed that to be profitable peas should be sown early in this district. The first fortnight in June was considered the best time.

WORK IN THE ORCHARD.—Mr. G. Howard read a paper on this subject, in which he stated that August should be a very busy month for orchardists. The vines should be the first to be pruned. A method of discovering whether the vines were ready for pruning was to cut three or four vines of different varieties in each row. The vines which showed no sign of bleeding could be pruned immediately, and the others left till a future date. Vines intended for trellising should be cut accordingly and all cuttings carried away. Manures should be applied to vines that had not made much growth. Peach and apricot trees should be pruned after the vines, and manure should also be applied to those of slow growth. Pruning should be finished by the end of the month and ploughing commenced, and a little later on it should be harrowed. Peach trees should be sprayed just as the buds were bursting. In the discussion which followed, Mr. Barraud contended that in a large orchard pruning should be commenced before August. Members generally considered it advisable to work the land as much as possible. Mr. Howard had used several varieties of manures, but he had had best results from the special orchard manure, and he thought this the cheapest to apply. Mr. J. Newell would not work the land deeply near the trees for fear of damaging the roots.

Miltale, September 21.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. E. P. Smith (chair), J. S. Jacobs, J. P. Story, A. R. S. Ramsey, E. Story, H. R. Jacobs, C. E. and S. R. Searle, T. A. and M. H. Wilson, W. E. Hier (Hon. Sec.), and four visitors.

IMPLEMENTS, STOCK, AND CROPS.—The following paper was read by Mr. E. Story:—“Efficiency and economy are the two main factors in successful farming; neither one must be sacrificed for the other, each is equally important. The farmer must always study which is cheapest and best in the long run. Now, for instance, a blacksmith's outfit will cost a farmer a few pounds, but if his farm is without one it will soon cost him a good deal of time and money in running to the local blacksmith with his picks, crowbars, broken machinery, &c. If he has a shop, on wet days he can furnish his farm with swings, hooks, &c., and also sharpen his ploughshares. He should have sheds for all his machinery, and all implements should be housed as soon as they have finished their work for the year. I would draw special attention to the binder, as it seems to be the shortest-lived machine on a farm. Most farmers are always too busy to put their binders on the transport wheels and draw them to the shed. Consequently they are left as near to the shed as is possible to get them without changing the wheels, through rain and weather, until harvesting is finished. A binder costs between £40 and £50, and so it is worth a farmer's while to take special care of it, and so get as much use out of it as he can. To insure a property will cost but a few pounds, while in the case of a fire or the death of a horse the farmer has to stand a heavy loss if uninsured. It is also the wisest plan for the farmer to insure when putting his mares to the horse. This will cost £1 extra, but the foal is worth it; sore shoulders are a serious trouble, and often cause a lot of waste time in the busy period of the year in washing horses' shoulders, brushing collars, &c. An American horse-driver says he has overcome this difficulty by lining the collar with pure white oilcloth. I have never tried this, but still it may be worth while. With regard to the destruction of rabbits, the only way that this difficulty can be overcome is for the district vermin board to be empowered to give the landholders but a certain time in which to destroy their rabbits, and if the work is not done put men on to do it at the landholders' expense. If this were strictly enforced the country would soon be much freer from the rabbits. The harvesting of the wheat crop is the most important business with which the farmer

has to deal. He must by all means get his crop off and to market as quickly as possible. For the general farmer the complete harvester is the quickest and cheapest machine for reaping, as he has a better chance of getting his wheat marketed before he is caught in a thunderstorm. Professor Lowrie has prophesied that harvesters will not be used 20 years hence. This may be so, but I believe they are the best machines for the farmer, except where he has the good luck to have three or four big boys of his own. If you keep your mind full of ideas about how to farm more successfully, and how to make the family more comfortable, educationally, physically, morally, and financially, you will not have much room for studying meanness or foolishness. It pays to know your trade and know it well. Do not say my farm, my horses, my crop, my cows, but our farm, cows, &c., for the good wife is an equal partner, and as likely as not the more important member of the firm." In discussing the matter, the Hon. Secretary said the only point in favor of harvesters was the saving of labor which they effected. He strongly believed that the use of the stripper and motor winnower was more economical. Mr. J. P. Story said that where the farmer was capable of doing the work, a blacksmith's shop was an excellent addition to the farm. Mr. W. G. Smith thought it advisable to insure stock, but it was not necessary to cover hay or buildings. Mr. Ramsey was not in favor of insuring mares or hay, but thought there was a general tendency to pay too little attention to farm implements. Mr. Searle considered it advisable to insure mares with the owner of the stallion, and the stallion with an insurance society. Mr. R. S. Searle thought the stripper was the most suitable harvesting machine, as the cocky chaff was saved, and this was an important item. In reply to criticisms, Mr. Story said that his experience pointed to the fact that the insurance of mares with the owner of the stallion was advisable. Members generally were of the opinion that steps should be taken to enforce the provisions of the Vermin Act, and it was pointed out that the unoccupied Crown lands in the district were breeding grounds for this pest.

Penong, September 26.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. W. Sanders (chair). A. Shipard, W. O. Harris, J. Stiggants, and J. Oats (Hon. Sec.).

SHAREFARMING.—In a paper on this subject, Mr. W. Sanders drew attention to the expense involved on the part of the landholder in providing the necessary stock and implements for sharefarming. During the past year he had entered into agreements with three men, and with horses at £35 a head, wagons at £70, drays £20, ploughs £40, drills £48, strippers £50, winnowers £30, harness £30 and the land costing about 9s. 6d. per acre to clear, the initial costs had been very heavy. In addition to the items mentioned above, it was necessary to provide a horse paddock, housing accommodation, &c. The usual conditions under which sharefarming was carried on in the district were that the proprietor found the whole of the stock, implements, &c., and all material for building, fencing, &c., whilst the other party provided the labor, half the seed, feed, and manure required, and carted all produce to market. In discussing the subject, Mr. A. Shipard said that before undertaking sharefarming it was essential that a careful agreement should be drawn up. Under circumstances where a man was placed on an improved farm, it was generally understood that a portion of the scrub was to be cleared yearly. The owner was expected to find all stock and implements, and in some cases where the shareman was careless there was a good deal of loss in this direction. Mr. W. O. Harris considered that a great deal depended on the character of the person employed. It was folly to put a man without experience on a farm, as there was much expensive stock and implements to be handled. Mr. J. Stiggants expressed the view that the owner should have control of the shareman in a way similar to that which obtained when he employed labor, and in this way direct the work. The Hon. Secretary had for years been working on the share system as follows:—He allowed a certain area to the person living with him, 60 acres in addition to his keep in the case of a single man, and 90 acres and a house where the man was married. The results had been satisfactory, as in a good season the shareman participated in the success, and when the season was unsatisfactory, he helped to bear the loss. He had found that when the above scheme was adopted the men took more interest in their work, endeavored to keep the rabbits down, and took good care of the stock and implements. He had also undertaken the half-share system, himself supplying the stock, implements, half seed, feed, and manure, and the man provided the balance of the seed, &c. Where the season was a good one,

it paid the man fairly well, but if the crop were a failure it would fall heavily on him. When this system was adopted, he believed in the shareman having a say in the management of the farm.

Petina, September 21.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. W. Penna (chair), D. T. and J. Kenny, J. H. Wharf, E. and W. Keeley, J. Bascombe, W. G. Lewis, H. Doley (Acting Hon. Sec.), and six visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. D. T. Kenny. Several of the members were driven round the wheat paddocks to a patch off which the crop had disappeared. Two hundred acres had been practically cleared, and upon digging about, the ground was found to contain numerous grubs or caterpillars and cocoons. Last year the seed was sown broadcast and ploughed in. This year it was drilled in and sown early.

SHARE FARMING.—Mr. H. Doley read the following paper on this subject:—"A good deal of share farming is carried out in this district, and it can be done very successfully if conducted properly and seasons are fair. It is a means whereby a landholder can use his land to good advantage. The labor problem is not yet solved, so he cannot work as much land as he would like, owing to the lack of competent and reliable men to do the work. When a steady young man is found he offers him a piece of his land to work, and he thus saves himself the worry, and with fair seasons gets good interest for his outlay. The general custom is for the landholder to find the horses, harness, implements, fencing material, and put down tanks, erect sheds and other necessities, and also find half the seed wheat, half the manure, and half the bags, receiving half the crop. The shareman finds the other half of the wheat, manure, bags, &c., and supplies the labor, receiving half the crop. It is a splendid education for a young man to commence farming on these lines, as it gives him an insight into the management of a farm. It is also a good way for a person to get a start where otherwise it would be almost impossible for him to commence farming from weekly earnings. A man should be prepared for worries and drawbacks. He is sure to get them. He needs plenty of energy and pluck. It takes about three seasons to get into proper working order, and there is a good deal of expense and risk. A man starting on the share system should have at least £60. If he can carry on his first year without going into debt it is a great help to him. A good investment is to buy a mare or two for use and also for breeding. In a few years he should have a team of young horses. It also saves driving the horses that are given in with the share contract. It is advisable to have a team consisting of geldings, or mares not intended for breeding. The presence of a number of mares in foal in the team is a great drawback, because when he requires them most they need rest. A percentage of the foals should become the property of the shareman if the mares in the team are allowed to breed, as the foals are a nuisance till after they are weaned. The mares cannot be expected to suckle a foal and do the same work as the other horses. Old and worn out implements and harness are too often given to the shareman. This should not be so, as a man should not be expected to keep in repair harness that has been worn out by others. If given new harness and implements he should keep them in repair and should be able to do the work quicker and better. A blacksmith shop, anvil, and necessary tools should be on every farm. Any small piece of work could be done, and in the busy seasons this would mean a great saving of time. Share farming in the new country blocks is very different from an old-established district. In the new country a man should be entitled to more consideration. He has to make the place, while on the old farm everything is in going order. In this country, where there is a good percentage of plains, a man should start by fallowing, and do as much as possible, as soon as there is sufficient feed. Some crop for hay should be put in, and then he would be sure of feed for seeding operations. The amount of crop should depend on the supply of water at his disposal."

Yallunda, September 21.

PRESENT.—Messrs. Olsten (chair), Forrest, W. Cabot, H. P. Cabot, Fairbrother, Jones, Bryant, Price (Hon. Sec.).

FRUIT-GROWING IN THE DISTRICT.—Mr. S. C. Fairbrother read the following paper on this subject:—"Great care should be taken in selecting a site for a garden, as success or failure largely depends on the class of land chosen. There are hundreds of acres of

land in this district eminently adapted for fruit-growing, and if the farmers were to plant a few trees each year, in time a nice flourishing orchard would be seen on every farm. The class of soil I would suggest for orchards is a deep red loam with red clay subsoil. On most of our sheoak, peppermint, and watergum land patches of this class of soil can be found. Low-lying flat land should be avoided, as this usually becomes very wet and cold during the winter. Most of our soil varies considerably. In one place a good red clay subsoil will be found, and near by it quickly changes to a yellow clay, or there is a deep deposit of gravel between the top soil and the clay. In my orchard the trees on the rising ground, where there is a red clay subsoil, are doing best. This land drains itself better and retains the moisture well during the summer. The position of the orchard is important. It would be a great advantage if protection from the rough westerly winds could be obtained. These do much damage to the trees in the spring and summer. Not only do they knock the trees about, but a good deal of fruit is blown off. The land should be well grubbed and cleared of all stumps, roots, and stones, and should be substantially fenced. Ploughing is the next consideration. If possible, a subsoiler should follow the mouldboard plough. But most of this country contains so many roots that it is a difficult task to use the subsoiler. In view of this, if the land is well ploughed with a good stump-jumping implement, it should be sufficient. It is advisable to dig the holes a month or two before planting the trees, because the soil is then well aerated. I usually dig the holes about 2ft. 6in. square and 15in. to 18in. deep. It is a mistake to sink them too deep in this country, because they will hold the water, and this is injurious to young trees. Twenty feet apart is a good distance to plant the trees in this district. When planting the trees, care should be taken to see that the roots are well distributed around the trunk and that they dip downwards. As the earth is filled in a little well-rotted stable manure should be mixed with it, but do not allow it to touch the roots. The earth should be made firm round the roots and trunk. The trees should be cut back well, as soon as they are planted. I prefer to cut about half the three main limbs away and cut off all small shoots. The land between the trees should be well worked with a cultivator or plough during the spring and a good coating of manure spread around each tree. A good hoeing will also benefit the trees, as it helps to keep the moisture in the soil. Apples and pears do better than any other varieties, and if a careful selection is made of the best export apples and pears, there should be a good living in a 10-acre orchard. We are very free from pests in this district. I have not yet seen the dreaded codlin moth. I have had no occasion to spray the apples or pears for any disease, and I feel confident that really good firm apples which will keep for months, can be grown in this district. I have apples which I picked in April. They have been packed away in a dry place for five months, and are beautifully sound and sweet. The firmer varieties will do better here than the soft varieties, but some of the soft sorts do well. The best kinds for this district are perhaps most of the Pippins, which are good keepers, Jonathans, King David, Cleopatra, Dunns Seedling, and Rome Beauty. With pears, Duchess are easily the best for export and seem to do well. They were selling in London last season up to 25s. per case; Vicar of Winkfield and Winter Nelis also do well. In plums most of the Japanese varieties do well, also Greengage, Orleans, Egg, Golden Drop, Grand Duke, Jefferson, and Prune. Of the apricots early and late Moorpark seem to do best. Peaches—Red May, Highs Canada, Hales Early, Early Crawford, Royal George, Belle of Georgia, Elberta, and Lady Palmerston. Vines also do well, and I am satisfied that we can grow as good grapes here as can be grown in any of the grape-growing districts in South Australia. I find that vines are rather slow in coming into bearing. It seems to take them longer here than in other districts."

EASTERN DISTRICT. (EAST OF MOUNT LOFTY RANGES.)

Clanfield. September 27.

PRESENT.—Messrs. W. Paull (chair), Pavy, A. Orwell, A. Clutterbuck, H. Milne, A. G. Franklin, L. Gilberton, L. Orwell, A. E. Heaven, A. Correll, Wm. Queale (Hon. Sec.), and four visitors.

THE CARE OF HAY.—The following paper on this subject was read by Mr. H. Milne:—"It is my intention to deal simply with the treatment and care of the hay after it is cut.

I favor the reaper and binder for cutting the crop. The sheaves should be stooked as soon as possible after being cut, especially if the weather is damp, as the sheaves on the ground will soon sweat and become discolored. I prefer the long, narrow stook made as follows:—Stand one sheaf straight up with two on each side of it at right angles to the row of sheaves and press the heads together. Then stand one sheaf flat on and one on each side of it, the heads slightly lapping. By keeping the butts of the sheaves close in and working both ways from the start the stook may be made any length and contain any number of sheaves, but about 20 to 30 sheaves make a nice stook. The hay will not then be damaged by rain, and it will withstand the wind. The time to cart depends a good deal on the weather, and also the condition in which the crop was cut; but about 12 to 14 days is usually long enough to let it stand. If the weather is hot and dry it can be carted sooner than in showery weather. If the hay is very brittle a good sprinkling with salt water will improve it, and if damp, dry salt will often prevent it going mouldy in the stack. If one has the capital a hay shed will be a paying investment. I have seen little stacks of hay in the hills with four poles and a sliding roof, which is lowered as the hay is used. With a hay shed the stack is safe in course of construction. Many stacks when half or two-thirds built have been pulled down on account of heavy rain, involving much loss of time and damage to the hay. The next best to a hay shed is thatching. Even second rate hay (grass hay or self-sown) will pay for the time and trouble. It is difficult to build a sheaf stack that will turn all the rain. Some builders thatch the stack with the heads of the sheaves while building. This will keep the water out but the grain grows and is spoilt and some of the hay is discolored, which would have all been good feed if the stack had been thatched. In the open it is advisable to have the eaves wider than the bottom of the stack, so that the drips will fall clear from the sides. A good method is to cut some straw with the binder, thus getting the straw straight and in bundles. Two men can thatch a large stack, say 60 to 70 tons, in a couple of days, and it is then safe for the winter." Considerable discussion followed, and the Hon. Secretary raised the question of the right stage for cutting wheaten hay. He believed in cutting as green as possible, because when hay was cut with grain just formed the mice would not trouble the stack as they would if the grain was ripe or nearly so. Mr. Gilbertson preferred to let the hay lie for a day or so before stooking, according to the weather. Mr. Orwell favored cutting when the grain was in the milky stage, as the chaff was sweeter and digested more easily. Mr. Milne said that in stooking hay in the narrow stooks the sooner it was stooked after cutting the better. Oaten hay was best cut when fully ripe. If cut green oats would powder when chaffing. The right stage to cut was when the straw was of a bluish tinge.

Clanfield, October 26.

PRESENT.—Messesrs. A. Richards (chair), A. Orwell, A. Clutterbuck, W. Paull, A. E. Pavy, A. G. Franklin, P. Nelson, J. Nelson, H. Pavy, L. Orwell, A. Heaven, Wm. Qucale (Hon. Sec.), and four visitors.

HARVESTER v. STRIPPER.—Mr. Richards read the following paper:—"The harvester is a combined stripper and winnower, the processes of stripping and cleaning the wheat both going on at the same time. The only stoppage necessary during work is for the purpose of emptying the box; the wheat being then ready for market. This is not the case with the stripper. It has to be driven to the heap and raked out, which entails a loss of time. The wheat from this machine is then cleaned with the winnower. Two men are generally required for winnowing, which involves extra expense and time. The harvester can be started earlier in the morning than is the case with the stripper, and it is possible for a man to take off 250 acres, single handed, with the former. The saving of labor is a most important point." In discussing the subject Mr. Pavy said, in reference to cleaning, that the stripper had a large advantage over the harvester, inasmuch as the outlay for the machine and horseflesh was considerably smaller. The difference in cost of the two implements would pay for a lot of cleaning. Experience over a number of years had shown him that the stripper could be put into the crop many days before the harvester. He had seen the stripper reaping nine days before it was safe to start with the harvester. The upkeep of the harvester was an item of considerable importance. In his opinion the life of that machine was seven years, whereas the life of a stripper was fifteen years. In a very light crop the harvester was very unsatisfactory, and in this case the winnowing was a small item. The loss of time by driving the stripper to the heap was more than made up by the time necessary to drive round the paddock picking

up wheat from the harvester when carting. The danger of fire getting into the stubble must not be overlooked, as there would be very little chance of saving the wheat from the harvester, as it would be scattered all over the place. The simplicity of the stripper was a great point in its favor. It was impossible for a harvester team to keep an even pace all through the harvest, and consequently the sample was sometimes bad. In rough stumpy country it lost a lot of wheat. If the ground were cleared of stumps no doubt the harvester would do better work. Mr. Orwell had seen a lot of wheat wasted over the tail of the winnower and had seen bad samples turned out from the stripper and winnower. The Hon. Secretary said it was practically a necessity for any farmer to keep at least one stripper on hand, because the saving of the cocky chaff was an important factor in new country. He would not advocate saving cocky chaff for the purpose of regularly feeding horses on same, but it was necessary to have something of the sort as a standby in times of shortage. The lightness of the stripper in sandy country was important. The harvester needed considerable attention to keep it in good order, whereas the stripper gave very little trouble.

Forster, September 26.

(Average annual rainfall, 10½ in.)

PRESENT.—Messrs. C. Hayman (chair), T., G., and W. J. Searle, J. Johns, G. and T. Retallack, E. Towill, R. Copp, J. G. Whitfield, C. Payne, W. Sears (Hon. Sec.), and nine visitors.

CONSERVATION OF FODDER.—Mr. C. Payne read the following paper on this subject :—“The farmers in the dry districts of Australia have bought their knowledge during the 1911 season at a very high price. Following a succession of good years the farmers should have had enough fodder reserved to help feed their stock through at least one bad season. Instead of this, on the very commencement of a dry season, they sold their cattle at about one-third of the real value, when a few tons of reserved fodder would have saved them. Farmers generally argue that they cannot afford to cut their crops to feed stock. They fail to realise that they waste the greater part of their crops by not saving the chaff and straw, which make good feed for cattle and young horses. A farmer runs less risk of storms and hot winds shaking the corn out by cutting it in the yellow-ripe stage with the binder and by taking the corn out with the header than by leaving it to get dead ripe for the stripper or harvester. Scientific men tell us that a crop cut in the yellow-ripe stage retains two-thirds of its hay sweetness. When a crop is cut at this period of its development there is enough moisture in the straw to develop the grain, and the sample therefore is just as good as corn that has been allowed to ripen for stripping. A farmer should not cut the whole of a large area with the binder, but he should cut as much as possible when it is in the yellow-ripe stage. To prove the value of the headed straw it is only necessary to compare it with the price of hay chaff during the present season. In this district hundreds of tons of hay chaff have been sold at from £6 to £7 per ton. On this basis it is easy to calculate the value of a fair-sized stack of headed straw if nicely chaffed. It would realise at least a third of the price of the hay chaff. Its value to the farmer, however, is very much greater. The ‘cocky chaff’ from a headed crop is much sweeter and softer than that from a crop which has been ripened for the stripper. The cost of harvesting with a binder and header is not very great, as most farmers keep a binder for cutting their hay crop, and a good header can be bought at a small cost. A large header takes very little motor or horse power to drive it. An important point is to have a good strong wagon or hay trolley and frame to cart it in quickly.” A good deal of discussion followed the reading of the paper, with the opinions in which members generally agreed. This country was considered too rough for binders.

FALLOWING.—Mr. E. Towill stated that with a 1,000 acre farm he would fallow 150 acres each year, and on this put oats. Members generally agreed with this opinion, although some were in favor of fallowing the whole area.

Geranium, October 5.

PRESENT.—Messrs. W. Mitchell (chair), W. J. and I. J. Mitchell, W. and F. Hammond, Jacob, Lang, Lithgow, Dohnt, W. Pannell (Hon. Sec.), and three visitors.

POTATO-GROWING.—Mr. J. Lang read a paper on this subject, in which he mentioned that the potato was one of the oldest vegetables known. It was growing in favor every

year, and the supply must therefore be increased to meet the demand. He thought this district suitable for the growing of potatoes, and would recommend them being planted on sandy loam, as it was the best soil to retain the moisture. All planting should be done in September, unless it was intended to water the plants, when they could be planted later. He would recommend planting Snowflake, Redskin, and White Elephant varieties. The land should be ploughed or grubbed to a depth of 12in., and should be worked to a fine tilth in order to conserve the moisture. Potatoes should be planted in rows 18in. or 20in. apart, and the sets should be 10in. to 14in. apart in the row. He had planted potatoes last year, not from the best seed, but they had turned out very well, some weighing from $\frac{1}{2}$ lb. to 1lb. He would recommend stable manure or bonedust, or would plough in a crop of green stuff, such as peas, beans, or rape. He had seen a good crop of from 5 tons to 7 tons per acre obtained by adopting this practice. Any quantity of water should be given until they began to flower, when watering should be discontinued. A change of seed should be made every two years, and cut sets should be planted with not more than three eyes on each. When planting cut potatoes they should be planted cut side downwards. When the potatoes were growing they should be well worked. He would recommend every farmer to try potato-growing, as they would considerably help to decrease the store account. In reply to questions Mr. Lang said that from 3in. to 4in. was the best depth to plant seed. The eyes should in all cases be turned upward in order to allow the shoots to come straight away and avoid the bend that would occur if the eyes were turned downward. In cutting large potatoes for seed two eyes were ample to leave on each piece. If more were left it would result in excess of stalks to the detriment of the tubers. The tail end of a potato was inferior to the front part, and should never be used. The cut surfaces should be dipped in ashes or lime. This would form a skin and prevent drying up or rotting. Stable manure was good as a fertiliser, but if bonedust were used it should be stirred about in the soil and not allowed to come in full contact with the seed. He would harrow potatoes as soon as they were showing above ground. There was no danger of breaking them off and the harrows would keep the surface loose. Where watering was possible planting could take place as late as October, otherwise September was late enough.

Hooper, September 25.

PRESENT.—MESSRS. J. R. Beck (chair), G. G. Pitt, J. Boyce, E. G. Colton, C. S. Hall, A. Hood, D. A. Byard (Acting Hon. Sec.), and three visitors.

HARVESTER v. STRIPPER.—The following paper was written by Mr. C. B. R. Wright, and was read by Mr. D. A. Byard :—"The harvester is a great saver of labor, and by using this machine the farmer can take his crop off without assistance. If the weather is at all damp and not suitable for reaping the bags can be sewn in the early mornings. With the harvester there are no heaps of wheat in the paddocks as there are when the stripper is used, and there is then no risk of the wheat being washed away, as it was in the Pinnaroo district a couple of years ago. When the harvester is used the farmer can be carting his wheat while his neighbor, who uses the stripper, is cleaning his crop. This saves a lot of time, and on country which has been cleared well and is free of stumps and large stones, the harvester makes a tip-top sample, as long as the sieves are set properly and are kept clean. The sample is, in fact, good enough for seed. The harvester pays in two ways. First as a time and labor saver, and secondly because the farmer generally clears his land better, in order to work the machine to the best advantage. Taking off a nice even crop with the stripper only requires a boy as driver, whereas the harvester requires an experienced hand to see that everything is working satisfactorily. The main advantage of the stripper is in that it saves the cocky chaff, which, in dry seasons, when hay is scarce and chaff is a big price, comes in very handy and has pulled many a farmer through a bad period. Not only in dry seasons is the chaff an asset, but in any slack time when the horses are not doing much work, cocky chaff and compressed fodder, or a little soaked wheat and pollard, or molasses, makes a good meal and is readily eaten. Some people advocate chaff carriers on the machines, but this practice is only useful when one wishes to save only a few bags. To save any great quantity the stripper cannot be beaten. I prefer the stripper for this district. The little extra which would be paid for cleaning would easily be made up with the chaff. A harvester is of more value on the Adelaide plains, or similar country."

Monarto South, September 28.

PRESENT.—Messrs. G. Patterson (chair), R. E. Anders, J. and H. Frahn, J. and R. Hartmann, B. Hoff, A. Harper, H. Hein, E. Kuchel, R. McDonald, A. Patterson, J. G. H., R., and G. Paech, C. Thiele, E. Tilbrook, C. F. Altmann (Hon. Sec.), and three visitors.

SHEARING.—An interesting address on this subject was delivered by Mr. A. Patterson, in the course of which he stated that the catching pen should always be provided with a grating for the sake of cleanliness. He strongly deprecated the rough handling of sheep by the shearers. Strict supervision was necessary if the farmer would save his sheep from rough treatment and sometimes serious injury. As few second cuts as possible should be made, as these dropped under the wool table and got in with the locks. Broken fleeces should be kept separate from the sound wool, and all stained wool placed together. Cross-bred wool should never be packed with the clip from the Merinos. Even the inclusion of one cross-bred fleece in the bale would affect the price realised. Members generally agreed with the views expressed by Mr. Patterson.

Monarto South, October 26.

PRESENT.—Messrs. G. Patterson (chair), R. E. Anders, H. and B. Frahn, A. P. Braendler, G. Gogol, A., E., and R. Hartmann, A. Harper, E. Kuchel, R. and G. Paech, A. Schenscher, C. Thiele, J. Hutton, E. Tilbrook, G. Thomas, J. Daly, B. Thiele, C. F. Altmann (Hon. Sec.), and five visitors.

HORSE-BREEDING.—In a paper on this subject Mr. A. P. Braendler said that where the farmer desired to have heavy draught horses, it was necessary for him to put stallions of this class to heavy mares. These as a rule were quiet at their work and very good with heavy loads. However, he preferred the medium draught for farm work, as they travelled fast and stood longer journeys daily. In addition, there was not so much risk with the mares at foaling time. Mares could be worked if well fed and carefully handled up to within a month of foaling time. After foaling they should be well fed and rested. The foals should be weaned after reaching the age of four or five months, and then should have an abundance of feed and water. In discussing the subject, Mr. Anders was of the opinion that farmers generally paid insufficient attention to the selection of their stallions. They should only breed from the heaviest draught horses. The majority of members, however, were in favor of the medium-sized draught of the heavy trolly type.

Morgan, September 28.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), E. Hausler, E. French, R. Wohling, jun., E. Gilgen, O. Hausler, I. Pope, J. T. Hempel, H. Wohling (Hon. Sec.).

POULTRY-KEEPING.—Mr. O. Hausler read a paper on this subject. In this district, he said, hatching should be over by the middle of October. In the hills and other late districts it could be continued to the end of October, but chicks hatched later than that were seldom as profitable as the earlier ones. Late birds did not commence to lay until eggs were cheap, the birds did not mature so quickly, they were not so robust or resistant to disease, and in the case of table birds, whether ducks, turkeys, or fowls, the early birds were ready for the best market. It also cost more to fatten late-hatched chicks and ducklings. The practice of keeping mongrels was unprofitable. It would pay everyone to secure some eggs from recognised breeds of reliable laying strains, particularly those whose birds had been successful in the Roseworthy Competitions. He thought it better to get the eggs than to buy the chicks, as the losses were less when the chicks were under the care of the hen than that hatched them. In the discussion which followed, Mr. French thought it advisable to get a fresh rooster in the yard from time to time to introduce new blood. Mr. E. Hausler had had good success with a sitting of first-class eggs last season. Mr. Gilgen advocated chaffed lucerne as a food for fowls. Mr. O. Wohling thought August was the best month to set hens in this district.

Parilla Well, September 26.

PRESENT.—Messrs. J. E. Johnston (chair), J. W. Johnston, J. T. Johnston, F. C. and A. Webster, E. H. and H. Leak, B. Jackel, B. Pahl, F. and A. Nordhausten, J. Flavel, W. Flavel, J. Ferguson, L. G. Neville (Hon. Sec.) and one visitor.

FARM HORSES.—Messrs. F. C. and A. Webster contributed the following paper:—
“Our district consists principally of sandy soil that is moderately easily worked, and in fair seasons there is abundance of green feed in the paddocks. In describing a horse suitable for this locality, we recognise that it must be one that will breed true to type. Irrespective of breeding, the horse should be what we term a good doer and a fair traveller. These qualities are usually found in an animal possessing the following characteristics:—Compact build, round barrel, well ribbed up, short back, good sloping shoulders, wide and strong across the loins, broad deep chest, moderate to short legs, clean strong joints, with plenty of well-developed muscle. We favor the medium draught, that is a size or two below our very heavy draughts. They thrive on less feed than the heavy animals, and as a rule travel much faster. In nine cases out of 10 the smaller horse will be found in the lead of a team with the heavy ones back in the body. It is easier to breed a medium draught true to standard than it is to breed a heavy draught. The majority of the heavy draughts are loosely built and have a tendency to slab sides and a long back. They are not fast movers and their own weight is often a burden to them. The most profitable foal is bred by a draught mare, should the owner wish to sell, that is, considering the price obtained for the foal only; but the price obtained for the foal is not the only consideration. For breeding foals for sale we favor mating the medium mares to a heavy draught stallion. It will be found that they will travel with greater ease while carrying the foal and will work nearer to the time of foaling than the heavy mares. Care should be taken in selecting a sire. Farmers should not patronise cheap or convenient horses. The most useful beast for all-round farm work and the most favorable to the majority of farmers is the medium Clydesdale. The brood mares, when near to foaling, should receive very careful attention, and should be kept in a paddock by themselves when expected to foal, and not allowed to roam among other loose horses. It is advisable to watch mares at any time when near foaling, especially during the night. Very often both the foal and mare die for the want of assistance when in the act of foaling. In these cases owners only have themselves to blame, as the trouble is brought on them through their own neglect. We advocate working brood mares well up to the time of foaling, provided they are in fair condition, in order to give them plenty of exercise and keep them from becoming too fat, as such is often injurious to the mare when foaling. The foal should be watched to see that it sucks properly and then turned out in a paddock where feed is plentiful. It is best to avoid working the mare while she is suckling the foal, which should be six months old before weaning. When being weaned it should be taken out of sight of the mother till she has dried off. A foal should be kept from its mother till she is properly dried off. If horses from five years old are fed well, they will comfortably do 10 hours' work or even more in the busy time of the year, such as harvesting; and eight hours will be found long enough through the winter months, as the work is usually wet and heavy. From two to three years old is the right age at which to break in young horses. Horses broken in at two years will be found none the worse for doing a little work so long as they are worked lightly. Coolness of temper and patience is needed when breaking horses. They should be carefully handled, the use of the whip should be avoided. They should be taken quietly and treated kindly. We do not believe in spending three or four days in handling a young horse, mouthing it up and letting it run about the yard with a bridle, reins, surcingle, and such like. Place it in the team among fairly reliable horses as soon as possible. We advocate working horses on one-horse swingle-bars in preference to spreaders. Both are used nowadays a good deal, and we find the swingle-bars are not so likely to cause the horses sore shoulders, as they put equal weight on the shoulders. It is advisable to have all chains of equal length. In working eight horses in a team or a plough or any such implement, place them all abreast. Thus each horse does its own share of the work. With leaders, one generally loads on the other. Horses should be groomed well at least once a day, and their shoulders should be always clean and free from dry sweat and dirt. Care should be taken to get a collar to fit the horse. Another important point is to see that the hames fit the collar, as a good many sets of hames made at present have the draught too low down, and most of the pressure comes on the points of the horses' shoulders instead of being distributed. It is a mistake to use a collar too large for the horse. It should always fit close in against the animal's neck. Bathe horses', especially young animals', shoulders with cold water after they have done their day's work in harvest time. This keeps them from scalding. Farmers should have their horses' collars lined and stuffed at least

once a year, and any horse that is subject to sore shoulders should have its collar eased where the sore touches. A good plan is to cut a small hole in the lining and remove the stuffing, and so prevent the collar touching the sore. A good warm roomy stable is best, and do not tie the horses up unless necessary, as this does not give them an opportunity to rest with comfort. Always feed with good sound food. Chaff should be cut at least a half inch in length and not powdered up into dust. This is the most beneficial feed, especially for aged horses, as they often have a tendency to bite off the heads of long hay, and the rest is practically wasted. One feed of long hay each day would not be amiss, especially late in the evening. The animal would then have ample time to chew its food with content. Long hay is also beneficial to the animal's teeth, as it prevents them wearing too flat. A little oats or other corn should be added to the feed at each meal. Too much is not good, as it may cause sores to break out on the shoulders. Oats is usually preferred for mixing with chaff." In discussing the subject Mr. J. S. Ferguson expressed the view that it was desirable when working teams of six horses or over to split the team up and work with leaders. He had tried feeding with long hay, and his experience was that horses could not be kept in good condition on this ration. Mr. E. H. Leak had found the use of a backband had the effect of reducing a number of cases of sore shoulders. Mr. J. E. Johnston preferred working brood mares right up to the time of foaling. He would not feed with long hay, as he considered this wasteful. Mr. L. G. Neville preferred the heavy horses for farm work. If the animal had not weight to put into the collar, it was necessary for it to use muscle, consequently the lighter horse fell away from condition more quickly. Oaten hay chaff was best for feeding horses, as it contained a good deal of grain, which was particularly suited to building up the strength of the horses. The feeding of long hay was wasteful, and in addition there was a tendency for the animals thus fed to become infested with worms through treading the hay under foot and then picking it up.

Pinnaroo, October 19.

PRESENT.—Messrs. B. L. Harfield (chair), M. Beckwith, J. Docking, H. E. Dibben, F. H. Edwards, G. Fuller, L. M. Ferguson, H. J. Harfield, F. Hunt, H. C. Hill, W. H. Kelly, H. Ledger, C. Lee, M. McCabe, B. H. Nash, E. H. Parsons, A. I. Reed, C. A. E. Schiller, L. Small, W. Venning, P. H. Jones (Hon. Sec.), and two visitors.

CAPILLARITY.—Mr. E. H. Parsons, A.S.A.S.M., contributed the following paper:—
 "This subject may be conveniently divided into three headings: (a) What is capillarity? (b) How does it affect our soils? (c) How is it to be controlled and used? Capillarity is the name given to a distinct physical phenomenon, which is easier to demonstrate than describe. If a thin glass tube, open at both ends, has one end immersed in water or any other liquid, the liquid will rise higher in the tube than the level of the liquid surrounding the tube. Liquids will rise naturally in microscopic tubes to a considerable height. The question now is: How does this physical phenomenon affect farmers? When rain falls it soaks downwards and in doing so forms millions of microscopic tubes or channels in the ground. As soon as the sun's heat dries the surface the moisture rises through these tubes to keep the surface damp. Sand, owing to its open nature, does not lend itself readily to the formation of capillary channels; hence the fact that sand will retain its moisture so very much longer than other ground. Of course, at present I am speaking of Pinnaroo sand, which is really a sandy loam over clay. If there were no clay bottom the moisture would soak away through the sand, but it is wonderful how long bottomless sand even will keep damp, owing to the comparative absence of these capillary tubes. The next question is: How can we control capillarity? The best way is by ploughing. The more open the surface is kept the less chance is there of forming capillary tubes. The whole secret of fallow retaining moisture is in this fact. The moisture from the winter rains soaks down into the ground, and in doing so forms millions of these microscopic tubes. When we fallow we break these tubes and imprison the moisture. But we must not stop at that. Each time rain falls a fresh lot of tubes are formed, although until the ground sets not to anything like the same extent as in virgin soil. To make fallow thoroughly effective these capillary tubes must be broken every time they are formed, i.e., after every rain. It must be borne in mind that the capillary tubes formed by a subsequent rain will let out the moisture conserved from a former rain. To put this a little plainer: If after the land is fallowed and harrowed, rain again falls after the harrowing and forms capillary tubes, these tubes will let out not only the moisture from the rain after the fallowing but also the moisture conserved by the original

fallowing. By this you will see clearly that it is only by continuously keeping the surface broken after all rains, by harrowing or any other means, that the loss of moisture from capillarity can be minimised and the best effects of fallowing, or retaining moisture in the ground, be obtained." Mr. McCabe remarked that whilst it was advisable to keep the top soil loose the harrowing or cultivating should always be done when the ground was wet. Working fallow in a dry state only increased the risk of takeall.

WHEAT-GROWING COMPETITION.—In conjunction with the Parilla Well Branch it was decided to start a competition for the purpose of securing pedigree wheat, and also improving the standard of the grain.

HORSE AILMENTS.—A member sought information concerning a form of grub which had been passed with the dung by one of his animals. Members were unanimous in the opinion that it was a bot, and the owner was recommended to drench his horse with 4ozs. or 5ozs. gall, subsequent to starving the animal for 24 hours, and then follow two hours later with a strong purgative.

Renmark, September 24.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. W. H. Waters (chair), H. DeWitt, J. S. Huggins, A. Braund, F. Cole, C. J. Everard (Hon. Sec.), and two visitors.

SULPHURING APRICOTS.—Mr. DeWitt reported that as the result of some experiments he had conducted he had found that if the temperature of the sulphur house were kept at about 50°C. only half the quantity of sulphur was would be required to obtain the same result as was needed if a lower temperature prevailed. Mr. F. Cole had secured better results from the use of a pug sulphur house than from one made of hessian. Some ventilation was necessary to make the sulphur burn properly. It was agreed by those present that dried apricots made better jam than fresh ones. Mr. A. Braund thought the best jam could be made from the green fruit.

Renmark, October 22.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. W. H. Waters (chair), H. DeWitt, E. Cole, H. S. Taylor, M. B. Geneste, C. J. Everard (Hon. Sec.).

DAIRYING AND FRUIT-GROWING.—Mr. Taylor suggested that fruit-growing could be profitably combined with dairying on the settlements adjacent to the Murray. Members generally regarded this as impracticable, as the majority of the growers of fruit would be unable to spend time in milking during the fruit season. Mr. Waters had kept three cows on three acres of paspalum during the summer. He sowed the seed in June, but the grass did not show up until the following February. On two acres of phalaris commutata grass he had kept four cows through the winter. Mr. Taylor thought lucerne was certainly the best fodder to grow under irrigation, and at Mildura there were a number of crops grown on 20-year old plants. The blocks had never been fed off.

Tintinara, September 28.

PRESENT.—Messrs. R. J. Gully (chair), C. M. Ives, G. Ives, D. N. and J. Bell, A. J. Bryden, D. T. Kennedy, T. Stead, W. J. Marshall, E. B. Northcott, J. Helling, D. McKeand, C. P. Hodge (Acting Hon. Sec.), and one visitor.

CULTIVATION OF THE SOIL.—Mr. C. P. Hodge contributed the following paper:—"Before dealing with the actual cultivation of the soil, I think it might be advisable to make a few remarks in reference to the preparation of the land before ploughing. To my mind the success or failure of the crop depends almost as much on the work done before cultivation starts as the actual cultivation itself. In this class of country it is of the utmost importance to get a good scrub burn. In fact, I deem it of such importance that I would strongly recommend anyone to leave a piece of land one or even two years longer, rather than plough it up without first burning the rubbish off it. Of course, there may be occasions when circumstances make it impossible to adhere to this rule. For example, a man may settle on a block of land here and find there is none of it in a fit state to carry a fire. Then, of course, he must make the best of a bad job and plough through the

rubbish. But where possible I feel certain that to obtain a fire before starting cultivation may safely be regarded as an excellent rule to follow. To ensure a good burn if the land be mallee, it should all be logged or rolled down, and, if possible, all springbacks cut. The same applies to heath country, for there is always sufficient dwarf oak, honey-suckle, &c., to pay for the time of knocking them down with a log. Where gum trees are encountered they should be mullinised level with the ground. Whether one secures a good burn or not, I would recommend the same practice in both instances, that is, to fallow the land well before attempting to put it under crop. I would even suggest this practice to the new settler. Of course, he must put in a little the first year, but let it be a little well put in, so that he may have a chance of cutting hay for himself for the following year. I should recommend that he only attempts to put in 100 acres during the first year and devote the rest of his time to fallowing for the following year. I am confident that he will be money in pocket by following such a policy, instead of trying to get a large area under crop straight away. The next point to consider is the time to fallow. This should be done as soon after seeding as possible. June and July, under normal conditions, are the best months in which to fallow here, for the ground is thoroughly wet, which enables the plough to do good work, as well as get rid of many more stumps and yaccas than would be the case if left till later when the ground is drier. By fallowing early the ground is left open to receive the heavy winter rain, which after all is one of the main factors of fallowing. The depth is a question which must largely depend on the nature of the country in which one is working. The soil is so variable that it would be impossible to lay down a hard and fast rule as to depth. For instance, in the sandy heath country, where one has so many yaccas with which to contend, I would recommend ploughing as deep as is necessary to plough out the majority of the yaccas. In the more firm mallee and gum land, I would suggest 4in. as a rough guide to the general depth, though this will necessarily vary with the nature of the land. Don't try to make the ploughing too smooth. In my opinion the rougher it is the better. I would rather see ploughing ridged here, than turned right over and left too level on top. If left too level the air and sun do not get into it sufficiently to sweeten it. Then, too, if left level the rain beats it down and it sets too hard to work up well. I recommend leaving the fallow rough, without even harrowing, until October, by which time most of the heavy rain will be over. Then I would harrow it. Do not work fallow deeply at all. Harrow again after each rain when practicable. In this way the surface is kept loose without the damp soil underneath being exposed to evaporation. This brings us on to seeding. In the case of fallow I would recommend working the land with the disc cultivator to a depth of about 3in. after the first heavy rains have fallen. Then harrow down in front of the drill. Where it is possible to cover the seed without harrowing behind the drill I would advise doing so, as I think it a mistake to leave the land too smooth. Where one must harrow after the drill to cover the seed I would not use this implement before the drill. I would rather see a little seed uncovered than harrow behind the drill. In the case of stubble land I would advise ploughing. Never put a crop in with the cultivator. If one has not time to work it up with the plough put in half the quantity intended, and leave the balance to fallow for the coming season. My objection to the cultivator as a means of working up stubble land is that there are always hard patches in this country that have not been properly ploughed the year before, consequently if one puts the cultivator into the land one is simply scratching over the surface of these hard patches again, instead of breaking them up well as would be the case with the plough. In conclusion, as a general principle, I would advise putting in a smaller quantity, but putting it in well, and where possible, let the bulk of the crop be put on fallow land, and I feel sure the present returns from this district will be nearly doubled. The sooner the land is ploughed and left rough the longer the sun and air have to penetrate it. This is an important matter, for air and sunlight are necessary for the life of the bacteria whose function it is to carry on the nitrification whereby the fertility of the soil is maintained. As to the best plough for fallowing, I would suggest that a disc plough be used for the first breaking up, to cut through the fibrous matter, and after that I would advise a good strong share plough."

CARE OF LIVESTOCK.—This subject was dealt with in a paper by Mr. N. Bell, reading as follows:—"The working stock on the farm should be our first consideration. They should be well housed and cared for in every possible way. For a climate such as we have here, I favor a stable closed in all around with large sliding doors, leaving all horses loose. Many farmers favor tying up or stalling them, but should fire occur a great risk is run, horses being as a rule awkward to get out. Much time would be lost in unfastening ropes or removing the animals from the stalls. Too much care cannot be given to the feeding and watering of horses. In a district similar to this feed is one of the farmer's biggest items, and most of us are endeavoring to get as much work out of our horses on as little

feed as possible. I favor giving an average working horse in three feeds, say, a daily ration of 20lbs. to 25lbs. of good chaff damped with molasses, which should always be fed where grass is at all scarce, to ensure health. Then a small quantity of oats, bran, or pollard can be added. Should oats be used 10lbs. a day would be found sufficient. When bran or pollard are fed, give, say 5lbs. of each. For sandy country I prefer the latter. A feed of two sheaves of hay should also be given at night. Horses should receive their meals at regular intervals if possible. When the farmer's work takes him any distance from the home, it is a good idea to nosebag at mid-day instead of unharnessing and travelling to dinner, as every little distance travelled helps to tire the team, and in winter a horse will go from morning until night without a drink. Of course, if water can be taken into the paddock so much the better. When the above plan is adopted great care should be taken not to let horses take too much water on coming in at night, especially if they are at all hot. For this reason I would prefer water outside of the yard. Another very important point with reference to the working horse is the attention to its shoulders. As many of us know, it is a very difficult matter to keep horses from galling in stumpy country, especially when corn is being fed at all heavily. Horses should never be harnessed without the shoulders being well brushed, and every trace of sweat, &c., thoroughly cleaned off. Too much time cannot be spent in fitting the collar. This is the most important factor of all, as should it be at all wide and bear on the shoulder-blades a gall will result. After the horse has been properly fitted with a collar the position for the draught should be well considered. Greasing shoulders when collars are removed at night, to my mind, is a mistake, as this method helps to accumulate the sand should the animal roll or lie down. I have found boracic acid sprinkled on the gall helps to heal the wound better than other treatments. The wound should be damped before the application is made. Dry black lead powdered and rubbed on the collar to come in contact with the affected part when horses are harnessed is beneficial. The latter treatment helps to work a face on the sore. The dairy cows should have particular attention if profitable returns are sought, and one of the most important items is proper housing. On most farms dairy cows are turned adrift and compelled to pick their own living; this is a great mistake, especially in scrub country, as the natural herbage is not a good butter producer. Cows should also be well fed, the feed including a little bran until sufficient grass is available. Should the weather be at all rough or stormy cows are better housed and stalled, the stalls being kept thoroughly clean. Many dairy cows are ruined through not being milked dry. Salt and bonemeal are two very necessary articles to ensure good health in our dairy herds, and boxes should be placed in convenient positions about the yards so that all stock may obtain any quantity they require. We would all do well to bear in mind the fact that it always pays to keep the best and most suitable stock, and the property on which they are running should not be overstocked."

Tintinara, October 26.

PRESENT.—Messrs. R. J. Gully (chair), D. A. and J. Bell, J. Donaldson, R. L. and L. M. Scott, N. and G. Bainger, D. T. Kennedy, D. McKeand, C. M. Ives, A. K. Wendt, B. G. and H. C. Filman, R. Henderson, and C. P. Hodge (Acting Hon. Sec.).

HANDLING YOUNG HORSES.—This subject was dealt with by Mr. C. M. Ives in the following paper:—"Young horses have different dispositions. They cannot all be handled in the same way, but must be treated with firmness and kindness. A horse has a good memory, and the first thing taught him, good or bad, has a decided influence over him. A timid horse must at all times be approached gently, giving it time to remember its previous lessons. When handling a young horse, if I see that he is losing his temper, or I feel like losing mine, I always get out of the yard for a while. To catch and handle a wild unbroken colt, I prefer a round yard about 21ft. in diameter. This is made from 10 posts about 11ft. long and 40 rails 6½ft. long. After running the colt into the yard, I allow him to stand for a few minutes, and when sufficiently cooled down, I take a light stick with a handkerchief or rag tied to the end and go quietly into the yard and stand still until the colt gets used to me. I then gently wave the stick and rag first in front of the colt and then behind, endeavoring to keep the animal as much as possible in the same part of the yard all the time and never letting him pass me. The colt will soon stand still and smell the rag and even allow it to pass along his back. I then gradually work closer, keeping my eyes on the horse's eyes all the time and rubbing his back and neck with the stick. By this time the colt will stand and allow itself to be stroked by hand, first on the shoulder and then gradually up its neck, round its ears,

and down its nose. A leather halter or headstall must now be put on. I first hold it for the colt to smell and then rub it on its shoulder, gradually working it up his neck until I can gently slip it over his ears. I then quietly buckle the throat and chin straps. I next take a long rein or light rope about 18ft. long and lunge the horse, but do not put a bit in its mouth. A colt should always be taught that he can be held and tied up before a bit is placed in his mouth. Do not haul on a horse's mouth and make it sore. If you do the horse is almost sure to develop a hard and uneven mouth. Mouthing is all education, and it is possible to teach a horse to guide anywhere by a band round the nose to which reins are attached just as well and perhaps better than if the bit is used. I use the rein on the headstall to keep the colt's head towards me while I rub him down on both sides and teach him to stand. The roller and crupper have to be put on next. I allow the colt to smell the roller, then rub him down with it, put it on his back, and with a short piece of wire with a hook at the end I reach under his belly and pull the buckle or ring at the end of the roller towards me so that I can buckle it without the risk of being kicked. Before putting the crupper on I generally strap up the colt's near front foot with a stirrup leather. When the colt is accustomed to standing on three legs, I pull his head round and hold the rein and his tail in my left hand while I put the crupper on with my right. Do not do the crupper up too tight, for if the horse becomes sore under the tail, he is almost sure to buck when ridden with a crupper. It generally takes from 10 to 30 minutes to put all the tackling on a station colt without roping him or putting him in a crush pen, but I have never found two alike. A wild colt that nearly goes mad with fright when a man first goes in a yard with him is generally very easy to handle once a hand is placed on him. A slow cunning colt is more likely to give trouble. If I have a vicious colt that comes at me with his heels the first time I get in a yard with him, I put a quiet old horse in the yard and keep him between the colt and myself as much as possible until I have the headstall and leading rein on. When I have the tackling on I generally let the colt have a rest for a few minutes. I then rub him down, throw bags on him, pick his feet up, jump up and down on the ground alongside of him and lean my weight over his back. After that I tie him up to a post, using a sound chaff bag and a good piece of ½ in. rope. I place the chaff bag folded lengthwise round the colt's neck and pass a piece of rope through the noseband under the chin and tie to the bag with two half-hitches. When the rope is attached to the bag round his neck I tie it to a strong post, but do not give him more than 4ft. of rope, for if the colt has too much play it is possible for him to break his neck. I generally put at the same time a light rope over his rump, like a breeching, so that if he hangs back too much I can give it a pull and make him stand up. After the colt has learnt to stand when I run up to him or throw bags on him, I teach him to lead. If a boy is handy get him to follow behind with a whip, but if there is no help, put a light rope or clothes line through the noseband of the headstall, then over his back round behind him like a breeching, once more over his back, and then tie the end with a bowline knot to the rope under his jaws. After I have taught the colt to lead, I put a bit in his mouth and some long reins on him and drive him round a large yard, first to the right then to the left, but not letting him go out of a walk. When he has learnt that lesson and does not try to get away, I drive him up and down the middle of the yard and turn him in all directions, teaching him to walk, trot, stop, and move on again, taking care not to jerk his mouth or do anything to make it sore. When I have him well under control and can walk and trot him and turn when and where I please, I put a saddle on him in the small yard and mount and dismount a few dozen times in as many different ways as I can think of doing it. If he does not stand, I hobble him or strap up his near front leg until he will stand. I next take him out in the large yard and ride him round, stopping frequently and getting on and off. After that I ride him out in the open, but generally get a man or boy to come with me on a quiet horse. The following day, if I wish to break the colt into harness, I ride him near a buggy for a mile or so and then tie the colt to the off-side buggy horse and drive about until he becomes accustomed to the noise of the trap. I then quickly take out the off-side buggy horse and put the colt in his place, but still keep the open bridle on the youngster. Start the pair off at a trot, and when the colt has settled down teach him to walk and stop and start again. Do not give a young horse too much work at first, for once knocked up he will never be the same horse again. A quiet farm-bred draught colt does not need so much handling as a station colt that never sees a stable, but I should teach him to lead and tie up in the same way. I should also mouth him and teach him to guide with the long reins in a big yard. I generally hitch draught colts to a very light log and teach them to turn in all directions, stop and go on again by word of command as much as possible. After that I hook them on to rather a heavier

log, but never ask them to pull as much as they are able to. It is then a good plan to put them into a wagon team on a good road, or where there is not much to pull. After that they should be tried at all kinds of work, but I do not ask them to do as much as old horses or horses that are accustomed to the work."

Wilkawatt, September 28.

PRESENT.—Messrs. J. Ivett (chair), W. J., D. F., and D. Bowman, T. and C. Sorrell, T. Sorrell, sen., J. W., G. A., and F. W. Altus, E. W. and H. H. Brooker, A. V. Ivett, A. J. McAvaney, B. Spackman, W. R. and M. Neville, J. P. O'Shea, M. Hayes, F. W. Gasmier, H. H. Pritchard, B. Tylor, P. Rigney, W. J. Tylor (Hon. Sec), and three visitors.

CLEARING BURNT SCRUB.—Mr. F. W. Altus read a paper on this subject, in which he advocated rolling burnt scrub just before harvest, as the scrub was then drier and would break better. It was then advisable to wait until after harvest before cutting the bushes, as they would have time to dry and it could be seen what needed cutting. If the bushes were cut a fortnight or three weeks before burning they gave more heat when burnt than if cut in the winter and the wind and rain were allowed to beat them flat on the ground. He would burn on a day when a good north wind was blowing. After burning he would rake all remaining sticks into heaps with a horse rake before the wind buried them with sand. Members generally agreed with the paper.

LUCERNE.—Mr. M. Neville read the following paper on this subject:—"The land intended for lucerne-growing should be fallowed as early as possible, and the stumps not pulled out by the plough should be grubbed out. The land should be thoroughly cleared and cultivated after a good rain, leaving it fairly rough. Enough stable manure to put a layer about 3in. thick on the land should be carted before ploughing the following season. The manure should be left in heaps to rot, as well-rotted manure is much better for ploughing in, and also has a more forcing effect on plant life than fresh manure. I would also cart enough for mulching purposes later on. Early in July the following year spread the manure and plough it in, sow a liberal quantity of bone manure or super., say from 1cwt. to 2cwts. per acre, and harrow it in. At the end of July broadcast about 60lbs. of wheat per acre and harrow the land till it has a fairly fine tilth. The wheat will protect the lucerne from frost later on. It would be advisable at that time to put a rabbit-proof fence round the plot, which would also keep fowls away from the seed. When the surface of the soil is fairly dry, harrow lightly and broadcast about 10lbs. of lucerne seed to the acre, and just slightly cover it. Hunter River lucerne is a very good variety to grow. It grows rapidly and is very hardy. When the crop has reached a height of about 6in. it is a good plan to cut it and let it lie on the ground, as it acts as a mulch to keep the surface of the ground moist, besides giving the crop a fresh start. The second growth will be more vigorous than the first, and should be cut when coming into flower, as lucerne is most nourishing at that stage. As soon as the second growth is cut the surface of the land should be worked moderately and a mulch of well-rotted stable manure about 2in. thick applied, which will keep the surface free and moist. This should be sufficient working and manuring for the first season. After the last crop for the season has been removed mulch with manure and leave it to winter. In early spring harrow thoroughly. This will give the crop a good start, and make it grow much thicker, because when lucerne is established the more it is knocked about after cutting the thicker it will grow. A good harrowing after each cut should be sufficient without manure to grow a good crop through the season. At the end of the season repeat the mulching and leave to winter. This method can be carried on from year to year and good results should be obtained. If at any time the crop is backward in its growth a dressing of bone manure will have a wonderful effect. Lucerne should be watered three or four days before cutting, as the watering makes it more succulent and the new growth comes straight away. I think that one watering besides this (in the growing period) would be enough for this district. Lucerne should be left at least 12 hours to wilt after cutting before being fed to stock, as otherwise they are liable to become blown. When cutting the lucerne do not cut off the crown of the plant, and never let the plant go to seed, because this is weakening to the plant itself, and the cut is of little value as a fodder at that stage."

SOUTH AND HILLS DISTRICT.

Cherry Gardens, September 24.

(Average annual rainfall, 35·3in.)

PRESENT.—Messrs. S. W. Chapman (chair), T. Jacobs, A. Broadbent, C. Rioks, C. Lewis, J. Lewis, J. Tozer, E. Broadbent, H. Jacobs, A. Jacobs, H. Lewis, T. Jacobs, jun., S. H. Curnow (Hon. Sec.).

CULTIVATION OF ROOT CROPS.—Mr. A. Jacobs read a paper under this heading. The relatively low prices frequently prevailing for root vegetables sometimes led the grower to treat their production in a haphazard manner. He thought, however, that if worth growing at all it would pay the gardener to get them as nearly perfect as possible. The soil should be in good heart, a condition secured by judicious manuring and adequate cultivation. Virgin soil would not produce good root crops unless the ground had been broken to a good depth before the preceding summer to allow sun and air to sweeten it. The land should be scarified several times towards the end of summer, preferably after rain. He would spread a good dressing of farmyard manure over the surface and leave it till planting time, when it should be dug in deeply and worked well into the soil. Root crops would thrive in the fine tilth thus produced. Mangolds, a splendid fodder for milch cows, should be planted in rich soil deeply cultivated, put in drills about 2in. deep, with the rows 2ft. apart. The plants should later be thinned out to about 9in. or a foot apart. Early in September was a good time to plant in this district. Beetroots required much the same treatment, but the distance between the rows and plants might be reduced by half and the seed planted 1in. deep. To make turnips and swedes grow quickly they also should be put in an even seedbed, in drills an inch deep, with the rows 10in. apart. They should be thinned out, leaving 4in. between the plants. He found it advisable to sow finely-rolled sulphate of ammonia over them at the rate of about 4lbs. to the rod. He would irrigate immediately, and in about three weeks time repeat the procedure. If irrigation were not practicable it was better not to force the growth. Potatoes should be put in good soil 4in. deep, and it was advisable to scarify the ground, if the surface were dry enough, just as the shoots came through. With all these crops, and many others, the hoe should be well used as soon as the plants were up, and continued until there was danger of damaging the top or root. Members were generally in agreement with the paper. Mr. T. Jacobs thought that land should be manured the year before parsnips or carrots were planted. Mr. Lewis said that only well-rotted stable manure should be used for these two crops, as new manure caused forks in the roots.

Hartley, September 25.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), J. F. Tydeman, D. Clark, W. Brook, W. Bermingham, T. Phillips, G. Phillips, S. Pratt, G. Hill, J. M. Hudd, F. Burns, W. T. Richardson, M. Hassam, J. Stanton (Hon. Sec.), and 20 visitors.

HOMESTEAD MEETING.—This meeting was held at the residence of Mr. J. M. Hudd. Upon inspecting the crops, the visitors considered they looked very well, considering the lateness of the season. With favorable spring showers there was every prospect of fair results. Some White Garton oats appeared to be rather roedy and inclined to run up, while the Black Cartons kept more to the ground, and looked the more promising of the two. The principal oat crop was of the Calcutta variety. A mixture of Glynas and Comeback wheats made the best crop on the farm. The peas also looked very well. The evening was spent with music and other items, and at the conclusion Mr. and Mrs. Hudd were cordially thanked for their hospitality.

Ironbank, October 25.

PRESENT.—Messrs. C. Morgan (chair), W. Dalton, E. Coats, R. Coats, N. Coats, S. D. Evans, A. I. Coats, F. Brown, L. Ahrens, J. Morgan, W. Coats (Hon. Sec.), and two visitors.

UTILISATION OF WASTE LAND.—In a paper on this subject the Hon. Secretary said that where they had land that was of poor quality, it could be utilised by first selecting

the trees that would be suitable for fencing, building, &c., and ringbarking these, then proceeding to cut the undergrowth out by the roots, and leaving it on the ground for a period of about 12 months to decay. This would improve the nature of the surface soil, and wattles could be sown. Stones should be gathered and heaped until such time as they might be required for walls, &c. Where the soil was of good quality, it could be carted to poorer spots, the pits being filled up to within 12in. or 15in. of the surface with stones, which should be covered with earth. The ringbarked trees would be ready for removal during the next winter. It would be found that this would improve the texture of the soil, and the land could be utilised for grazing, gardening, or for growing timber. The writer did not believe in allowing a fire to go over the land. In discussing the subject, Mr. F. Brown considered that a scrub burn was good for the soil, and Mr. T. Jacobs agreed. Members were generally divided in opinion on this point.

Kingscote, October 7.

(Average annual rainfall, 18½in.)

PRESENT.—Messrs. J. Turner (chair), P. T. Bell, J. Wright, K. Nash, F. W. Jacká, S. H. Anderson, M. J. Chigwin, J. Codling, V. H. F. Cook (Hon. Sec.), and one visitor.

MIXED FARMING.—Mr. J. Turner contributed a paper on this subject. Every farm of about 500 acres of fair average land in this district, he said, should be conducted on a system of mixed farming, such as keeping a few sheep and cows, about 150 to 200 fowls, and the necessary horses for working the farm. About four draught horses and one or two saddle or trap hacks should suffice. The sheep would provide fresh meat for household use, and the skins and wool would yield a small income. All the butter for home consumption would be supplied from the cows, and there would probably be a surplus for sale. The fowls should supply all the eggs necessary, and would also be a source of income. By judicious management the profits from the sheep, cows, and fowls would be sufficient to pay the storekeeper's and miller's accounts for 12 months. Every farmer should grow his own vegetables on the farm. This would save many journeys to the township for fresh supplies. Each journey entailed the loss of probably half a day, and he had calculated that 50 acres of land could be fallowed in the equivalent of time so lost during a year. If the season turned out dry and late, as it did this year, these 50 acres would be of great advantage to the farmer. It was better to work 20 acres thoroughly, and perhaps obtain a 30bush. crop, than to work 40 acres in a slovenly manner and perhaps not get 15bush. to the acre. This was the fault of some of the farmers in this district. A great advantage of mixed farming was that money was coming in every week, and it was not necessary to wait for the one cheque each year. It was essential to look after the details. Mr. Wood wished to know if it were advisable to fallow land on the Island. Mr. Turner stated that for three years on one paddock he could not obtain a return of seed. He then fallowed the land and obtained an 80bush. crop of barley. Mr. P. T. Bell stated that he had fallowed and had obtained a worse crop than before. The ground was too wet. He would not recommend fallowing in the back country, as the rainfall was very heavy. Mediah was considered the best wheat for hay in this district.

Longwood, September 28.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. W. H. Hughes (chair), H. Winter, J. C. Blakley, J. Nicholls, J. Roebuck, A. F. Furniss, G. W. Doley, J. R. Coles (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—This meeting was held at the homestead of the Chairman, Mr. W. H. Hughes.

TRIFOLIUM SUBTERRANEUM.—An inspection of the property revealed the fact that this clover took possession of the ground, killing other grasses. It was agreed that it was a good plant and would withstand a lot of feeding, but a decided drawback was that after killing the other grasses it was itself gone by autumn, leaving the ground bare.

IRISH BLIGHT AND BURGUNDY MIXTURE.—One of the members reported that he had dipped 18½cwt. of potatoes for seed in Burgundy mixture, made with 1½lbs. of soda, 1lb. of bluestone to 10galls. of water, just before planting at Christmas time. From an even crop there was not 6lbs. of affected tubers. There was every indication that the seed potatoes were affected by the blight, as 1½cwt. were so bad that they had to be picked out and destroyed.

Meningie, September 28.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. A. Ayres (chair), Hill, Scott, Taylor, Yates, A. and E. Dainty, W. Tregilgas (Hon. Sec.)

FIG RAISING APART FROM DAIRYING.—Mr. W. Tregilgas dealt with this subject as follows :—A man could make a living in this district with about 100 acres of medium quality land worth from £2 10s. to £3 an acre. He should put in about 20 acres of lucerne, fenced off into four paddocks, for grazing purposes. Fifty acres under wheat should return about 600bush. of grain—sufficient to bring from 150 to 200 pigs to the most profitable weight for marketing. A pig of more than 120lbs. or 130lbs. weight required a good deal more feeding to produce a pound of pork than a lighter one. He would get 10 of the best sows procurable and one boar. At a low estimate these sows should give 150 young ones in the year. He found it more profitable to send dressed pork than live pigs to the market. With proper management they could be sent as pork during the hottest months, which was not practicable with live pigs. The wheat should be boiled before being fed, and 4bush. fed to a weaner of eight weeks old would last 10 weeks and bring it up to the 100lbs. weight. With lucerne grazing this amount of wheat would last much longer. As an estimate of the income that might be expected he quoted 150 pigs weighing 120lbs. each and valued at the reasonable rate of 4d. per pound, which worked out to £300. The owner would do most of the work himself, but would probably contract with someone to take his crop off instead of purchasing the expensive machinery necessary. It should not be difficult to get 600bush. from 50 acres of wheat, as the farmer would cultivate such a small area properly and get as much from it as a man with a larger holding and more slipshod methods would reap from 100 acres. The breed of pigs to keep was a matter of opinion, but he preferred the Berkshires. The sows of this breed had a tendency to eat their young, but that difficulty could be overcome by giving them some meat occasionally. Very little discussion followed. Mr. Yates considered the Essex the most profitable breed of pigs to keep.

Mount Pleasant, September 20.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. H. A. Giles (chair), P. and J. S. Miller, T. C. Phillis, G. A. Vigar, D. C. Maxwell (Hon. Sec.).

RETENTION OF AFTERBIRTH.—Considerable discussion took place on this subject. One member suggested the insertion of about 3ft. of guttapercha tubing into the womb. The protruding end should have a funnel in it, and into this a mixture consisting of about a double-handful of common washing soda in a bucket of milk-warm water should be poured. The tubing should then be gently removed, and, as a rule, it would be found that the afterbirth would come away. If this should not be the case the treatment should be repeated, and in any case it would have a tendency to cleanse and heal the internal organs. [The opinion of the Veterinary Lecturer, Mr. F. E. Place, B.V.Sc., M.R.C.V.S., was sought respecting this treatment, and he replied as follows :—“The mechanical part of the proceedings as described is advisable, but will not always succeed. The amount of soda suggested is too high for general use, although it does no harm in this particular case. It would be preferable not to use more than 2ozs. or 3ozs. to the gallon.”—Ed.]

Morphett Vale, October 15.

(Average annual rainfall, 22½in.)

PRESENT.—Messrs. H. V. Sprigg (chair), F. W. Crittenden, F. Rosenberg, J. Perry, T. and A. Anderson, T. Higgins, A. Connole, E. E. Hunt (Hon. Sec.).

ROTATION OF CROPS AND SHEEP.—Mr. H. V. Sprigg read a paper on this subject, which he also read at the Conference of Hills Branches of the Agricultural Bureau. This will be found printed on page 476 of the current issue.

Narrung, October 18.

PRESENT.—Messrs. Thacker, Hackett, Barker, Bowyer, E. Neville, Harwood, Clarke, S. Bottrill, Bolger, Critchley, S. E. Morgan (Hon. Sec.), and several visitors.

HOMESTEAD MEETING.—Members of the Branch assembled at the Narrung homestead, and took the opportunity of visiting the stock and crops. Much interest was taken in the pony stallion Roman Warrior and the Red Pole and Hereford cows. A nice plot of lucerne, which had been growing for about 12 years without cultivation or resowing, was inspected, and a small plot of strawberry clover, growing on heavy ground, was thought to be a useful fodder. This grass grew to a height of about 18in., was green all the year round, and stock were very partial to it.

DAIRYING INDUSTRY.—In the evening, the Government Dairy Expert, Mr. P. H. Suter, delivered a lecture at the Narrung Institute before a large audience.

Willunga, October 5.

(Average annual rainfall, 25½in.)

PRESENT.—Messrs. Pengilley (chair), Binney, Blacker, Waye, Hughes (Hon. Sec.).

CONGRESS.—After giving their report of the proceedings at the Annual Congress, the delegates expressed the view that too much time was wasted by representatives of Branches in discussing various matters. It was suggested that a time limit of five minutes should be fixed for delegates' criticisms. In some cases persons took up about a quarter of an hour in empty criticism, whilst other men, who had perhaps something of value to impart, were crowded out for want of time. Mr. Hughes suggested that a secretaries meeting could be arranged during the sittings of Congress, and expressed the view that a great deal of practical good should follow this step.

Woodside, October 23.]

(Average annual rainfall, 31in.)

PRESENT.—Messrs. R. P. Keddie (chair), W. King, W. Morcom, F. Baldock, G. Johnston, H. Rollbusch, G. J. Sampson, J. W. Disher, J. A. Morcom (Hon. Sec.).

WORKING SMALL HOLDINGS.—Mr. F. Baldock contributed a paper on the subject of the best means of making a small farm of 40 or 50 acres pay. The land should be cleared, he said, but enough timber for fuel and shade for stock should be left. It was advisable to divide the area into paddocks of five or six acres each, in order that the stock might be changed frequently. Good sheds should be built, and the stock housed at night and well bedded in the cold weather. Manure from the stables should be allowed to rot before being used. Eight or nine acres should be planted for hay and peas, and about two acres with different fodders, such as early green feed, mangels, maize, and chou moellier. It was not advisable to feed chou moellier to milking cows, as it tainted the milk and butter. One good horse would do all the work on the farm. A mare should be kept for breeding purposes, and she should bring in a profit of about £12 to £15 per year. It was not advisable to keep the progeny too long. Five good cows should be kept to come into milk at different periods, in order to yield a supply of milk and butter all the year round. They should be well fed, and the food should be changed as often as possible, with a regular time set for milking and feeding. They should bring in a profit of about £35 to £40 per year. Two pigs were sufficient, and the progeny from these should be marketed when four months old. The young pigs should be given a little pollard with milk for two or three weeks, and then fed on soaked peas. Pigs should bring in a profit of about £12 per year. About 30 fowls should be kept, and two or three hens set at the beginning of April and again in August, in order to obtain summer and winter layers. By selling eggs and young fowls a profit of about £16 10s. should be made. Half an acre of potatoes would return a profit of £8 or £9. Calf skins and other small items should yield about £3. Milk, eggs, bacon, poultry, fruit, and vegetables formed the most of the foods for home consumption. All waste vegetables should be boiled for pigs and fowls. If worked properly there was little expense on a small farm.

Uraidla and Summertown, October 7.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. E. Hart (chair), J. Rowe, H. F. Johnson, T. Day, Pappin, Kessell, Squires, T. Collins, R. N. Cobbledick, E. Hawke, G. Prentice (Hon. Sec.).

GENERAL FARM MANAGEMENT.—A paper on this subject was read by Mr. R. N. Cobbledick, the text of which will be found on page 489 of the current issue. In discussing the subject, members generally agreed with the ideas embodied in the paper. Mr. T. Day thought an effort should be made to regulate the crops, as by this means a good deal could be done in the way of obviating a glutted market. Mr. Rowe was of the opinion that members should generally utilise the railway facilities for marketing their produce more than they were in the habit of doing. In reply to various points, Mr. Cobbledick said that it was his view that the plough was better than spades for cultivating, as the work could be done more often and it was cheaper.

SOUTH-EAST DISTRICT.

Glencoe, October, 21.

PRESENT.—Messrs. H. A. Cameron, M. D. Cameron, A. Dow, J. Dow, J. Holloway, W. Lehmann, J. Riddoch, jun., F. A. Telfer, G. F. Ferguson (Hon. Sec.), and one visitor.

CURL LEAF FUNGUS.—The Hon. Secretary reported the prevalence of curl leaf fungus on peach trees after the foliage had appeared. He had sprayed with Bordeaux mixture when the buds were swelling, but owing to the rough nature of the weather the spray had been ineffective. Mr. J. T. Halliday (a visitor) had tried all kinds of spraying compounds, but his efforts had been unsuccessful. He believed in cutting the trees hard back at the end of the season occasionally, and also the practice of summer pruning as the best means of coping with the pest. Mr. M. D. Cameron had one tree which was so badly affected for three years that he anticipated the death of the tree, but it had seemed during the past two seasons to have thrown off the fungus and excellent crops of fruit had been secured.

Keith, September 29.

PRESENT.—Messrs. Morcom (chair), Williams, Tyner, Packer, Thompson, Schultz, Fulwood, Pearson, Aberle, Godlee, Hutchings, Leishman, Graves, Dall, and Lock (Hon. Sec.).

LAMBS FOR EXPORT.—Mr. Williams read a short paper on this subject, in which he stated that he preferred the Shropshire ram for breeding lambs for export in this district. He would procure a draft of ewes from 6-tooth to full mouth, and of as large and coarse a frame as possible. They should lamb about the end of June. He would sow rape and mustard on stubble ground in order to catch the first rains. It would then get a good start before the cold weather set in. Fifty acres of rape, provided it obtained a good start, should provide for 200 ewes with the lambs, in a 100-acre paddock. In about five months the lambs should be ready for export. In the discussion which followed, Mr. Packer thought it advisable to sow rape on fallow. The Hon. Secretary was of the opinion that a mixture of wheat, chaff, and bran was a good ration for ewes when feed was scarce. Bran was a good milk producer.

Lucindale, October 19.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. Rayson (chair), Feuerherdt, Langberg, Dow, J. McInnes, L. McInnes, F. D. G. Secker, Carmichael, Ferguson, Johnson, W. M. Secker (Hon. Sec.).

APHIS.—Mr. Feuerherdt, in tracing the life history of the aphid, said that until this year growers in the south had been able to cope with this trouble, but they were now

experiencing some difficulty with it. When the peach trees were first blossoming, the first batch of aphids hatched out from the eggs. This batch consisted of both the male and female. The male was winged, and after copulation took place, died, and the female, being impregnated, produced impregnated females for the rest of the season, until a hot day was encountered, when she laid her eggs and died. These eggs were the starting of the brood for the following season's aphids. Ants have been observed carrying the aphids from one tree to another, and this had been explained on the grounds that the latter insect had on its back two projections out of which it exuded a fluid which the ants used as a food. Their object in transferring the aphids was to provide it with abundance of food in order that it might thrive and keep up a supply of the fluid. As a preventive measure he advocated spraying the trees early with either tobacco wash, kerosine emulsion, or resin wash. After the latter was used it was very difficult to clean the spraying outfit. Bisulphide of carbon had been used as a fumigant in the ground to prevent the eggs hatching, but as this would also kill the tree, its use was dangerous.

RED SPIDER.—Mr. Secker reported that last year he experienced a lot of trouble with red spider on part of a kitchen garden on which cauliflowers had been planted. This year beans were growing on the same patch, and they were likewise badly affected. Mr. Feuerherdt mentioned that the spider spun a web on the underside of the foliage on which it lodged, and this protected it from the effect of the spray.

Millicent, October 1.

(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. G. Mutton (chair), H. Hart, J. J. Mullins, J. Bowering, G. G. Serle, W. Downs, H. Day (Hon. Sec.).

MAIZE.—A discussion took place with regard to the cultivation of maize. Mr. Hart expressed the view that this fodder would not grow well in the Millicent district on what could be termed the light swampy land, but on the heavy drained land it would be found to thrive well. Mr. Serle had secured some good crops of maize, but he had noticed that it was very liable to be affected by frosts. The Chairman had reaped a very profitable crop by simply broadcasting the seed on ploughed land and harrowing it several times. Horse Tooth was thought a suitable variety.

BUNCHY CROPS.—The Chairman remarked that he had noticed several crops in the district which grew very "bunchy." Mr. Serle expressed the view that the trouble was due to drilling in wet weather. The hoes became clogged, and on being cleaned an extra supply of super. was deposited. This did not prove, however, that the use of more super. would result in a heavier yield of grain, although the growth of the straw might possibly be heavier.

MANURE FOR POTATOES.—Mr. Hart recommended the use of lime as a manure for potatoes, especially in clean land. A first-class manure for this crop was secured by mixing 25lbs. of potash with 25lbs. of mineral super. Mr. Bowering mentioned that a mixture of wood ashes and stable manure gave excellent results.

Mount Gambier, October 12.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Wedd (chair), Watson, Wheeler, Major, Fowler, Sassanowsky, Bodey, Simes, G. Collins, D. Collins (Hon. Sec.).

ORCHARD PESTS.—Mr. R. Fowler, district inspector of fruit and vegetables, read the following paper:—"Naturally, the codlin moth (*Carporapsa pomonella*) will easily receive first place as the most serious pest to be found in our gardens, though it would not occupy that position in some orchards in the South-East. The codlin moth has now spread to almost every garden and orchard in the State, but that fact is no argument why measures should not be taken to keep it within reasonable bounds and reduce the loss caused by it. It is in neglected gardens that orchard pests increase and multiply; they practically become hatcheries, supplying fresh broods of pests and diseases to the careful gardener, and if any fresh serious pest comes along it is in these places it obtains a firm hold and breeds up. To successfully cope with the codlin moth it is not merely sufficient to get a spray pump and some spray mixture, and at any odd time spray the trees. Careful and systematic attention must be given to various operations right through the season, and with regard to spraying there are several points that require attention. It is necessary

(1) to use the right mixture and the right strength; (2) to spray at the right time; (3) to put the spray where it is wanted, and in addition prepare the trees for the spraying, and supplement the spraying by attention to the bandages and the cleaning away of rubbish. The tree should be properly pruned, and by that I mean it should be treated in such a way that it will not be necessary when spraying to use a long ladder. The tree should also be well opened so that the spray can be applied to the inside as well as the outside, and bear in mind, when spraying for codlin moth, that it is the fruit and not the leaves that need to be sprayed. In most of the gardens I have so far visited the trees are much too high and thick, particularly the pear trees, and these should be opened by having the centres taken out. I would not advise reheading altogether by cutting back all the main limbs in the case of pears, as I am afraid the subsequent growth would be so strong that before the trees commenced to bear again they would be as high as ever. It is necessary to use the right mixture at the right strength, and it is now universally acknowledged that the best preparation to use is arsenate of lead, numerous brands of which are on the markets, in either the paste or powder form, at the strength of, in the case of paste, 1lb. to 20galls., and of powder 1½lbs. to 50galls. When spraying for any pest or disease it is well to know something about its life history and habits, and also something of the nature of the spray that is being applied. No good results would be obtained by spraying an insect pest with a fungicide or a fungoid pest with an insecticide, and these mistakes are sometimes made. I have seen apricots sprayed for shothole with Kedzie's solution, the old spray for codlin, and apples sprayed for codlin with Bordeaux mixture, which should have been used for shothole, and the gardener wondered why his apricots were scorched and the codlin was as bad as ever, though he had sprayed three times. I know of no spray that is a cure-all. No up-to-date orchardist uses any spray as such, as different pests require a different action from the spray. Thus arsenate of lead kills by poisoning, and is only effective with such pests as eat it (*mandibulata* or gnawing insects). Tobacco wash, resin compound, scalede, and red oil kill by coming in contact with the tender bodies of the insects. They are contact sprays, and are effective against all scales and aphides. These insects get their nourishment by suction (*Haustellata*), and would not be affected by arsenate of lead. The contact spray kills by burning or suffocating. Burgundy or Bordeaux mixture, which is a fungicide, acts by checking the spread of fungus diseases by means of spores. Neither of these mixtures is effective against codlin moth, aphides, or scales. As the codlin moth, in its larva stage, exists by gnawing and eating, it will be seen that a spray that kills by poisoning will be most effective, as, though perhaps a contact spray would kill, it would never be possible to get the contact, as the larvæ do not long remain on the outside of the fruit. At the present time the larvæ or grubs of the codlin which left the apples late last season are to be found in the grub stage, still only a very few will have changed into the moth, and will be found under the rough bark in crevices and knot-holes, particularly in the latter, where the half-rotten dead wood still remains. These larvæ will, in the course of the next 10 days or so, perhaps in some cases a little longer, according to the temperature and other conditions of the hiding place, change into a small reddish-brown chrysalis, and when the apple and pear blossoms fall and the young fruit is noticeable the moths will burst the chrysalis case and find their way into the open, mostly doing so at night. They soon pair, and the female commences to lay her eggs, depositing them, in the case of the first brood, rather in or near the calyx of the fruit: so the first spraying should be done immediately the blossoms fall and while the calyx lobes of the fruit are still open. The spray should be put on in such a way that the hollow cavities of the young fruits are well filled with the arsenical poison. The young grub, when it hatches from the egg, which will be in a few days from the time the egg is laid, immediately begins to eat its way to the centre of the fruit to get at its natural food, the pips of the fruit. At the time it comes from the egg it is a very small thing indeed, and would hardly be visible to the naked eye but for its tiny black head. In about three weeks time the caterpillar is fully grown, and it then tunnels its way out of the fruit. If the fruit has not already fallen to the ground, which is very often the case, it spins a silken web and lowers itself either to a limb of the tree or to the ground, and it then crawls for refuge either to the tree stem or any other available shelter to spin a cocoon, change to a chrysalis, and again emerge as a moth. This cycle is repeated twice, if not three times, during the season. I have said that the first spraying should be done when the blossoms fall, but as the moths do not all come out at the same time, and the female does not lay all her eggs at once, and the fruit grows rapidly at this time, it will be seen that a second spraying will soon be necessary to cover the unprotected portions. This is usually given about a fortnight after the first, and is followed by a third three weeks or a month later, and with late varieties of apples a fourth should be given. It is the second generation of moths that gives rise to the most destructively numerous

brood of caterpillars, and the more effectively the first spraying is done the smaller in numbers will the second generation be. The second and subsequent broods are laid anywhere on the fruit, and the idea is to keep a constant film of the poison covering all parts of the fruit, so that whenever the young grub makes its attack it will get a dose of poison. Briefly summed up, to treat codlin moth effectively it is necessary to prune trees to within easy reaching distance from the ground, scrape off and burn all dead bark from the trunks and limbs, pay particular attention to knot-holes and crevices, and saw off any split or broken limbs on apple, pear, and quince trees; and do this at once, as in a week or two it may be too late to catch and kill any grubs hiding there. Spray with an approved brand of arsenate of lead when the blossoms fall, and repeat the spraying three or four times. Remove all vegetable growth, stakes, stones, old fences, &c., from round or near the trees. Place bandages on the trees before the end of November. Look through them every eight or nine days, killing any grubs found in them, and later on pick and destroy any infested fruit found on the trees or on the ground. All grubs with black or brown heads are not necessarily codlins. The grubs which caused so much damage in the early part of the season in the potatoes were the larvæ of the potato moth (*Lila solanella*) and not of the codlin moth, as is often asserted. It is often said, 'What is the use of my spraying or doing anything if my neighbor does nothing?' and that argument, while one simply puts on bandages and picked infested fruit, is unanswerable; but that is not the case now. In the bandages one only catches the grubs after they have destroyed the fruit, and no matter how many one catches the neighbor keeps up the supply, but by spraying the grubs are destroyed before they spoil the fruit. So no matter how ineffective one's neighbor's methods may be if the spraying is properly carried out one will reap the benefit. With regard to other insect pests there are only a few to which I need refer. The gardens I have visited have all been more or less affected with apple mussel scale (*Mytilaspis pomorum*), and, though rather late to deal with it, some steps may still be taken. This scale is described by French as a most destructive pest, and though at present not doing much harm, it is not wise to allow it to get too numerous. I would suggest that badly infested trees should be painted or sprayed on the lower limbs with either red oil emulsion, scalecide, or kerosine emulsion. As all these mixtures will injure the foliage, care must be taken in using them. A vigorous brushing with a stiff brush will remove the dead scale from the limbs. Another insect pest noticeable in the gardens is the harlequin fruit bug (*Dindymus versicolor*). The eggs of this noxious insect are deposited during the late summer months amongst rubbish, under logs, stones, crevices of old posts, and in decayed wood. The young on being handled emit an abominable odour. They do a certain amount of harm to the fruit by inserting their nostrums, or beaks, into or through the skin, extracting the juices and causing the fruit to spot and become disfigured. The only remedies I can suggest are a free use of lime or sulphur, scalding with hot water, or spraying with tar water of the consistency of 1lb. to 50galls. Other insect pests which cause considerable trouble at times are the black aphid of the peach (*Myzus cerasi*) and woolly aphid, or American blight, of the apple (*Schizoneuria lanigera*). Time will not permit of my going into a description of these insects. I would suggest as treatment spraying with scalecide or red oil in winter, and with tobacco wash in summer; and in the case of woolly blight the spray must be well driven in with considerable force, as the woolly down acts as a natural protection to the bodies of the insects. As they increase with alarming rapidity it is necessary that the spraying should be repeated every two or three days for a time. A good hot wind in November considerably checks these pests. The curculio beetle (*Otiorhynchus cribricollis*) has been found a hard pest to deal with. Placing traps filled with red oil has so far been found the most effective remedy. Tying woolly bands around the stems is another good plan. The chief fungoid diseases are peach curl leaf (*Exoascus deformans*) and shothole of the apricot and plum (*Phyllosticta circumscissata*) and black spot of the apple and pear (*Fusicladium dentriticum*). It is now too late to effectively deal with curl leaf fungus, but shothole can still be sprayed with some good results to the trees with a 1 in 10 solution of Bordeaux or Burgundy, and it is still time to treat apple trees for black spot. It must be remembered that the mixture is a preventive, and must be applied in time to anticipate the attacks of disease. The mixture is meant to destroy the spores of the fungi wherever it comes in contact with them. It therefore follows that the whole of the surface, under as well as over, should be coated with the mixture. It goes without argument that rainy or very windy weather is not suitable for spraying: a dull day is also preferable to a very hot one. The best time to apply the Bordeaux is just when the buds are bursting, or when the colors of the folded petals of the flowers are just visible. This black spot is a very serious disease in damp localities, and in such places it is not advisable to plant apples that are very subject to it, such as Cleopatras, for instance." In reply to questions Mr. Fowler said he had

not seen many curculio beetles at Mount Gambier, but had heard that they did considerable damage to roses here. Mr. Watson had seen the Bordeaux mixture very effective when properly used, and also the arsenate of lead for codlin moth, but both must be applied at the proper time. He suggested that it would be a boon to small orchardists if someone would arrange to spray their trees for them at a specific fee. The Chairman said it was a good thing to spray more than once for shothole in apricots, and the trees might be sprayed when the fruit was as large as marbles, or even bigger. Mr. Watson would like to see some scheme worked out to enable small orchardists to have their trees regularly sprayed. He spoke very highly of the benefit of spraying, which, he thought, saved up to 90 per cent. of the fruit.

Wirrega, August 24.

PRESENT.—Messrs. C. F. and E. Meier, F. L. and A. Densley, H. Laurenti, H. Exton, H. Rogers, W. Fairweather, W. Goldsworthy, S. Purdie, C. and R. Williams, L. Cook (Hon Sec.), and two visitors.

FARM HORSES FOR NEW COUNTRY.—A paper on this subject was read by Mr. Meier—"I prefer to have young horses," he said, "because an aged horse cannot stand the wear and tear of starting a new farm. I favor a good medium draught, short coupled in the back, with good sound legs, not too long and with flat bone. The high-priced and extra heavy draught can be procured later on. A man cannot feed his horses by weight, as some require much more feed than others. With a very little observation he can find out what his horse will eat, and then give him as much as he will clean up. If the feeder is cleaned right out, give him a little more next time. The feeder should always be empty in the morning, as the chaff if left in the feeder will soon become sour, and the horse will not take a proper meal from it. It is very important to have the stable well protected from draught, with plenty of ventilation at the top of the wall, high enough for the draught to pass over the animals. When warmly stabled—horses do not require nearly as much feed as they would if left in an open yard. Clean the stable out every morning. It will then be dry by night, and less bedding will be needed. To keep horses fit and well attend to the grooming. As soon as the sweat has dried a little in the evening give the horses a thorough currycombing to remove sweat and dirt, and in the morning give a good grooming, paying special attention to the shoulders. If the horse has any sores do not touch him with the currycomb, but use the brush freely to remove all dirt. Long hair on the shoulders should be clipped, or it will become matted under the collar and will chafe the skin. Clip the hair off as closely as possible around the sores, and above all things keep the collars clean and smooth. In the general handling of the horse be as gentle as you can, as the quietest of horses are easily excited, and a horse will remember an unjust blow longer than the man who gave it. A steady hand on the rein and a quiet word will do more good than a jerk on the mouth or a bang with a spreader. If you must use the whip, give one or two smart cuts, and afterwards treat the horse as if nothing had been wrong. Nothing is gained by bullying a horse for half a day for the least thing wrong. It will only make him pigheaded, besides knocking the others about. A mistake often made in this sort of country is over-loading the team. Nothing takes the heart out of a horse more than making him pull more than he can manage with comfort. It is better to make an extra trip than to spoil the team for the sake of gaining a day. After horses have had a spell it is advisable to work them lightly for a week to get used to it again, and also to set the shoulders."

Wirrega, October 5.

PRESENT.—Messrs. H. Exton, C. F. and E. Meier, R. Williams, W. Fairweather, A. and F. Densley, L. J. Cook (Hon. Sec.), and five visitors.

FARMING IN MALLEE COUNTRY.—Mr. Rae, a member of the Tatiara Branch, who had been working land of a similar class to that of the Wirrega district for some years, gave the following interesting notes. "I consider our first thought should be to prepare an area on which to grow hay, as in my opinion this is the most important item connected with farming. Every day taken to cart chaff is a day wasted. I would suggest that the best piece of land in the section be chosen. The denser the scrub the better. If gum country, cut the timber as close to the ground as possible, and make a thorough job of it. It will be repaid at harvest, when time is much more precious. It may save a broken knife-bar, a broken pole, or some other more or less costly break: also save a

trip to Bordertown and possibly a two days' wait for the new part. Then plough with as much draught as the team can manage in order to break as many roots and pull out as many stumps as possible. Do not use the cultivator in preference to the plough. Personally I do not favor the cultivator, and have yet to see the one that will work satisfactorily in this class of country. Sow slightly over a bushel of seed per acre, as the plant does not stool to any great extent here. Apply as much manure as possible, say 150lbs. per acre. My experience is the heavier the dressing of super. the heavier the crop. I have taken five crops of hay in succession from one paddock, and the quantity of super. and yield per acre have been as follows:—First year—75lbs. Law's super., yielded 9bush. oats per acre; second year—90lbs. Mt. Lyell super., yielded 12cwts. hay per acre; third year—120lbs. mineral super., yielded 15cwts. hay per acre; fourth year—150lbs. guano super., yielded over one ton hay per acre; fifth year—150lbs. guano super., yielded about one ton hay per acre. On new country the land should not be ploughed more than 3in. deep, as the subsoil is too sour for the first year. In preparing for the main crop all rolling should be done in March or April. There is then a good percentage of the sap up the tree, and when cut the roots are deprived of a good portion of their strength. Let it lie until the following year before burning. There will then be shoots about 3ft. high, which will add to the fire and act as a double check on the roots. If these suggestions are carried out, there will be little trouble with shoots after cultivation. If there is strength to put in 1,000 acres properly, do so, but if only strength to put in 250 acres, be satisfied with this area. I would suggest that not less than 90lbs. be sown here. The grain crop does not need so much super. as the hay crop: 90lbs. will give as much head as would be secured from 150lbs., but not so much straw. I would also like to see more fallowing. When 500 acres have been burnt, put in 250 acres and fallow the remainder for the next year. I feel confident it will pay to do this, for there is nothing like fallow to sweeten the land. Where sheep are kept sow about 2lbs. of rape and mustard or thousand-headed kale to the acre. The last-named has done splendidly with me. After seeding is done plant a few fruit trees. If fortunate enough to have a patch of limestone on the land, make a small kiln and burn it; then put a small quantity around each tree and the result will be surprising. Under this treatment last year some of my trees made up to 7ft. of new wood. Also prepare a plot for English grasses. I have tried a great many kinds; and my experience is that for a winter grass *Phalaris commutata* has done exceedingly well. Buy an ounce or two and sow it in a small plot. When big enough transplant it with about 1ft. between the plants. Cocksfoot is also a splendid grass and grows well here. *Paspalum dilatatum* is worthy of a trial and is a good summer and autumn grass. The best clovers I have grown are Italian and Subterranean. Both being annuals, they must be saved for seeding. Lucerne does very well, but needs a lot of water and manure to make it a success. Couch grass does fairly well and is good for binding the sand. With a few pounds each of the above grasses one will soon have a nice grass paddock to act as a chaff saver. I cannot recommend the following, as they have proved almost a failure here:—'Prairie, Sheep's Burnett, Fog, Rhodes', Cowgrass, and Alsike clover.' A very good discussion ensued, especially in regard to the quantity of super. to apply. Several voiced their failure to see the necessity for more super. being applied to hay crop than to wheat. A discussion took place on guano super., which was acknowledged by several to give better results than ordinary mineral. Mr. Fairweather attributed this, not to the 1 per cent. of nitrogen, but to the fact that the phosphate in the guano super. in conjunction with our soils became more readily available to plants than was the case with mineral supers.

AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

Pruning of Fruit Trees, by G. Quinn, 1s. 3d.; posted, 1s. 7d.

Vinegrowers' Manual, by A. Sutherland, 6d.; posted, 7d.

Reports of Conferences of Australasian Fruitgrowers held at Brisbane and Wellington, 1s. each, or 1s. 1d. if posted.

Journal of Department of Agriculture of South Australia, 1s. per annum in advance: 3d. per single copy to residents of South Australia; 2s. 6d. per annum to other places.

Any of the following Bulletins and Leaflets may be obtained by sending a penny stamp for postage:—

Agriculture, Miscellaneous: Agricultural Bureau Congress Reports; Agricultural Experiments; Amount of Spirits to be Extracted from a Ton of Raisins; Depth of Sowing of some Agricultural Seeds; Hints to Intending Irrigationists; Housebuilding in New Districts; Lucerne Cultivation and Management; Lucerne Harvesting; Milling Characteristics of Australian Wheats; Milling Experiments; Milling Qualities of South Australian Wheats; Reclamation of Land; Roseworthy College Farm Flocks; Roseworthy College Harvest Reports; Roseworthy College Permanent Experimental Field; South Australian Wheat Yield, 1907-8; Stage to Cut Wheat; Hay; Trial of Stone-Gathering Machines; Salvation Jane or Paterson's Curse.

Horticulture: Apple Mussel Scale; Bordeaux Mixture; Cidermaking; Curculio Beetle; Codlin Moth; Currant Industry; Defects in Export Apples; Fertilisation of Orchard Lands; Fruit Drying; Fruit Flies; Fruit Preserving; Grape Vine Mildews; Gumming Disease of Peach and Almond Trees; Selection and Planting of Fruit Trees; Irish Potato Blight; Peach Leaf Curl Fungus; Plums and Prunes; Preserving, Canning, and Drying Fruits; Production of Early Tomatoes; Remedies for Diseases of Fruit Trees and Vines; Some Notes on Almonds.

Dairy: Milking of Cows; Spaying of Cows; Taints and Flavors of Dairy Produce.

Stock: Branding of Stock; Stomach and Bowel Diseases of the Horse.

[Every farmer and fruitgrower should join the Agricultural Bureau. Write to Department of Agriculture for particulars.]

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

South Australian Butter in England.

In his report to the Minister of Agriculture, dated London, October 11th, the Trade Commissioner states—"The dairy show, under the auspices of the British Dairy Farmers' Association, was opened on Tuesday, the 8th. I feel sure you will be gratified to learn that Messrs. Taylor Bros., of Gawler, succeeded in obtaining first prize for both their salted and unsalted butter; and also that another South Australian firm, Messrs. Lauterbach Bros., of Woodside, secured a 'Highly Commended' certificate."

Barley and Oats.

Commenting, in his estimate of the wheat harvest, on the probable yield of barley and oats the Government Statist (Mr. L. H. Sholl, C.M.G.), states:—"Last season 43,616 acres were sown for barley, and 224,781 acres for oats, and for this season the reports indicate an increased acreage for both cereals. In the South-Eastern Division the increase is general, and good yields of both grain and hay are expected. County Fergusson, with an increased acreage, reports barley crops 'fair to good,' and oats 'poor to fair,' and in the other parts of the State, where these two crops are grown to any extent, only a fairly good general yield is expected."

Bee Scouts.

Mr. F. A. Joyner writes—"A theory has frequently been put forward to the effect that the final location of a swarm of bees when it leaves a hive is determined by scouting members of the swarm. I have had very considerable doubt as to the correctness of that theory. My view has recent'y been to some extent modified by an experience which should interest your beekeeping readers. In each of the past three successive years a swarm of bees has taken possession of a cavity in the walls of my house at Bridgewater. The entrance to the cavity is through an open joint in the timbers, and is high up under an overhanging roof. The fact that three separate swarms should find their way to such a secluded and comparatively dark abiding-place affords to my mind some evidence of their being guided by scouts to a new home." Commenting on Mr. Joyner's letter, the Inspector of Apiaries (Mr. T. E. Whitelaw) states:—"The theory that swarms, when undisturbed by human

agency, finally locate in situations determined by scouts, is usually studied from two standpoints—(1) That scouts are sent forth previous to the swarm issuing from the hive. (2) That scouts are sent away after the swarm has issued from the hive and have clustered on some object near at hand. The whole matter is one that is difficult to obtain conclusive evidence upon. There have been many experiences somewhat similar to the one described that appear to be due to some system of scouting. It would be interesting to know whether the swarms in question went direct from the hive to the roof without clustering first.”

The Manufacture of Casein.

The dried curd of skim-milk, which is commonly called casein, is destined to become a big factor where creameries exist. Now that the direct cream supply is the principal system employed in this State only in a few cases could the manufacture of casein be employed, and it is doubtful if it would prove payable. Some little time back a company for casein manufacture was co-operating with a Victorian butter factory, but at the present time it is closed down. Casein is produced by curdling the milk with a weak solution of sulphuric acid and then expelling the moisture in the same manner as that employed in the early stages of cheese-making, namely, by heating and stirring. After the whey has been run off the curd is then pressed in the cheese press, and it is then passed through a special mill to tear the curd into small pieces, after which it is passed into a steam dryer, out of which it comes as hard as flint, and is ready for shipment. One hundred pounds of skim-milk will produce 3lbs. to 3½lbs. of dry casein. The residue, or rather the whey, from the casein is practically as good as the whey from cheese for feeding purposes. The purposes for which casein are required are numerous, amongst which are those used for paper sizing, wood filling, in the manufacture of paints, pencil erasers, adhesives, and substitutes for ivory.

The Importance of Lime.

The effect of lime on the soil (says the *Mark Lane Express*) is threefold—nourishing, chemical, and physical. (1) Its effect as plant food.—Lime is an absolute necessity for the growth of plants, although the requirements of the different crops vary in proportion. Leguminous plants of all kinds are especially exigent for a liberal supply. Soils unable to support a crop of clover may be brought into a condition to grow a plentiful one by a dressing of lime. Roots, cereals, garden produce all require a soil well stocked with lime; indeed, nearly all plants exhibit a strong, healthy growth in soils where lime is sufficiently present, assuming, of course, the other plant foods

are also in abundance. Under its influence the plants develop more powerful root growth, more solid structure, and greater capacity to withstand disease. Fodder crops produced in lime-rich soils contain better nourishing qualities than crops grown in lime-poor soils. (2) The chemical effect of lime.—The soil is sweetened by application of lime. The mineral food constituents in the soil, such as potash and phosphoric acid, are rendered more quickly available by its action, and it causes a more rapid decomposition of the organic substances by encouraging the activity of bacteria. Soils that, in consequence of sourness, are unable to grow satisfactory crops are soon changed by the action of lime into a healthy condition. (3) The physical effect of lime.—The physical and mechanical condition of soils is improved by applications of lime; it makes the soil looser, warmer, and more friable, more easily tilled, and not so liable to crust on the surface. Cold stiff clays are wonderfully improved by its action.

Natal Wattle Bark.

Natal wattle bark finds its way chiefly to Germany. The tanning trade in England favors tanning extracts. Last year the price of wattle bark on the London market ranged from: £7 18s. 9d. to £8 10s. per ton. Twenty years ago the price was as high as £16, while it has been as low as £7 5s. In 1911 South Africa exported bark to a value of £289,557, so it has become an industry of considerable importance to Natal, practically the only source of supply at present.—*South African Farmers' Advocate*.

Dependent Britain.

As a nation we pride ourselves on our independence (says the *Mark Lane Express*), but, as a matter of fact, we are, perhaps, the most dependent people on the face of the globe, inasmuch as we have to depend on our neighbors not only for our luxuries but actually for our daily bread. Now and then we are brought face to face with this fact. A little more than a year ago, when the railway service broke down temporarily on account of the strike, we realised how near we always are to starvation; and now, again, when, owing to foot-and-mouth disease, the removal of store cattle only across the Irish Sea is stopped, we have the grazier finding out how utterly dependent he is on his Irish neighbor, while the butcher finds himself in the same position, and with him eventually the consumer. Mr. C. Bathurst, M.P., has recently brought forward a scheme by which our country might lay in a store of grain for times of emergency and corn-growing could be made profitable to farmers. Whether it will ever take other shape and become more than a scheme remains to be seen; but, at any rate, it shows us where we stand, and how entirely dependent we are.

An Interesting Experiment.

An interesting experiment has been made this season at Gulval, situated right in the centre of the largest early potato district in West Cornwall, to test the value of an application of sulphate of ammonia to the crop. The land is described as having a southern aspect, and the character of the soil is loam. This season a trial was made to find the effect of a dressing of sulphate of ammonia against the dressing of another nitrogenous manure. The plots received the usual quantity of mixed dressing and guano, at the rate of 60 loads per acre, and 12cwts. of guano. Throughout the growth of the crop the plot that received the sulphate of ammonia showed superiority, which was confirmed when the crop was raised—the result being that from the sulphate of ammonia plot (one-tenth of an acre) 25 baskets of large and two and a half baskets of small potatoes were gathered; while from the other plot 19 baskets of large and two and a half baskets of small potatoes were taken. This experiment demonstrates that for early potatoes on such land sulphate of ammonia is an excellent fertiliser that can be depended on to produce very satisfactory results.—*American Fertiliser*.

World's Horse-Jumping Record.

The world's horse-jumping record, says the *Live Stock Journal*, was broken at Vittel, in the Department of the Vosges, at a horse show there. The Australian horse Beskra and the thoroughbred Montjore both cleared 2 metres 36 centimetres (approximately 7ft. 8in.), thereby beating the officially-recognised record hitherto held by the horse Conspirateur.

Application of Quicklime to the Soil.

The action of quicklime on the soil was the subject of a paper read by Dr. H. B. Hutchinson, Rothamstead Experimental Station, Herts, at the annual sessions of the British Association held recently at Dundee, Scotland. It was pointed out that the addition of small quantities of quicklime to field and garden soils stimulated general bacterial growth, but that large quantities caused an initial depression in the numbers of bacteria and a cessation of all biological processes. Dr. Hutchinson next read a paper on "Studies on Nitrogen Fixation." It is found that when plots of land were allowed to run wild for some years they showed a considerable accumulation of nitrogen in the upper layers of the soil. This has been attributed to the utilisation of the plant residues for nitrogen assimilation by free-living organisms. Dr. Hutchinson described the attempts which had been made at Rothamstead to induce similar changes in field soils. Barley plots which were taken for

experiments received spring or autumn applications of sugar or starch for some years. Spring applications of carbo-hydrates were made in the four years 1906 to 1909 and were followed by decreased crop yields. Autumn applications in 1909 and 1910 resulted in a decided increase of yield over the control plot.

Agricultural Value of Carbonate of Lime.

Professor James Hendrick, Marischal College, Aberdeen, contributed a paper on the agricultural value of carbonate of lime recovered as a by-product from causticising plant. In many parts of the country, he said, this precipitated carbonate of lime was thrown on the dump-heap as a waste product, while surrounding fields might be hungering for it. The soils of the north-east of Scotland were almost without exception poor in lime, yet this substance went to waste. A number of field experiments had been carried out with this carbonate of lime, in which it had been compared with other forms of lime, such as burnt lime and ground limestone. The experiments had all been made on land deficient in lime and very subject to finger-and-toe in turnips. So far as they had gone they showed that, whether the results were measured by increase of crop or by diminution of finger-and-toe disease, the precipitated carbonate of lime did at least as well as any other form of lime. It had, on the whole, acted better than an equal quantity of commercial ground limestone. This might be expected, as it was very much finer and was therefore more thoroughly mixed with the soil.

The Ills of City Life.

The following is taken from an address by Dr. L. Hill, M.B., F.R.S., before a meeting of the British Association :—" Conditions of city and factory life diminish the physical and nervous energy, and reduce many from the vigorous health and perfectness of bodily functions which a wild animal possesses to a more secure, but poorer and far less happy, form of existence. The illchosen diet, the monotony and sedentary nature of daily work, the windless uniformity of atmosphere, above all, the neglect of vigorous muscular exercise in the open air and exposure to the winds and light of heaven—all these, together with the difficulties in the way of living a normal sexual life, go to make the pale, undeveloped, neurotic, and joyless citizen. Nurture in unnatural surroundings, not nature's birthmark, moulds the criminal and the wastrel. The environment of childhood and youth is at fault rather than the stock ; the children who are taken away and trained to be sailors, those sent to agricultural pursuits in the colonies, those who become soldiers, may develop a physique and bodily health and vigor in striking contrast to their brothers who become clerks, shop assistants, and compositors."

Value of a Fertiliser.

When considering the value of a fertiliser, it should be borne in mind that the agricultural value—i.e., the effective fertilising capacity—and the “commercial value” of fertilising materials are not always in harmony. A fertiliser’s agricultural value is determined by the increase produced by it in the crop. The commercial value of a fertiliser is dependent on the cost of the materials which enter into its composition. A fertiliser may have a high commercial value—i.e., it may have cost much to produce—and yet have a low agricultural value for a particular soil and crop. A fertiliser is dear to a farmer, even although it cost little, if its use does not result in a profit; a fertiliser is cheap, however much it cost, if its use increases the crop to such an extent as to leave a good profit.

Spanish Olives and Oil.

During the first three months of 1912 there were 58,230,616lbs. of olive oil distributed from Seville, Spain, a greater quantity than ever before during the first quarter of the year. Of this amount 1,156,113lbs. were shipped to the United States. During the same quarter 7,157,258lbs. of olives were exported to the United States.

Imports and Exports of Plants.

During the month of November 12,541bush. of fresh fruits, 3,246 bags of potatoes, 124 bags of onions, 3pkgs. of plants, and 142pkgs. of vegetables were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 542bush. of these bananas (chiefly over-ripe) were rejected. Under the Federal Commerce Act, 260 cases of fresh fruit, 2,620pkgs. of dried fruit, 41pkgs. of preserved fruit, and 3pkgs. of honey were exported to oversea markets during the same period. These were distributed as follows:—For London, 10pkgs. of dried fruits, 3pkgs. honey; for South Africa, 700pkgs. of dried fruit; for New Zealand, 1,885pkgs. dried fruit, 120pkgs. oranges, and 20pkgs. lemons; for India and the East, 120pkgs. apples, 41pkgs. preserved fruit, and 25pkgs. dried fruit. Under the Federal Quarantine Act, 8,411pkgs. of plants, seeds, bulbs, &c., were examined and introduced from oversea markets.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

GUMMING OF ALMOND TREES.

"W. G. R.," Adelaide, asks the cure for gumming of almond trees.

Reply—Mr. G. Quinn, Horticultural Instructor, writes:—"There is not to my knowledge any known cure for 'gumming' of the almond tree stem. The use of Stockholm tar has a tendency to keep caterpillars from boring the stem and aggravating the flow of gum, but it will not stop the exudation of gum, which is really degraded and congealed sap which bursts from the tissues. As far as investigations have gone the degradation is believed to be due to a fungus which finds an entry to the sap vessels *via* a wound. As far as I can observe here the Brandis, White Nonpareil, Peer ess, and other softshell almonds of local origin are more subject to 'gum' than the Californian varieties such as Hatch's Nonpareil, I.X.L., and Ne Plus Ultra. In consequence of this I advise using these sorts, and would suggest you seriously consider cutting yours off below the gumming area, paint the cut sections with Stockholm tar, and when young shoots are emitted and reach the diameter of a lead pencil or so, bud into a selected number one of the kinds named, preferably Hatch's. In a couple of years there should again be a good head upon the trees."

"S. H. R." asks—(1) If it is safe to apply liquid poultry manure to a 10-year-old lemon tree, and (2) the proper season for budding peach, apricot, and lemon trees.

Reply—Mr. Quinn writes—(1) In applying liquid manure, always water the trees freely, either immediately before or after the liquid manure is applied, as this dilutes it and minimises any injury which might possibly arise from the absorption of a strong dose. (2) *Budding*.—This operation may be performed at any time whilst the sap is active in the little stocks, providing, of course, buds for insertion are procurable. Usually the buds are taken

from the shoots of the current season's growth, and for peach and apricot you would probably have to wait till December here ; but lemon buds could be obtained at any time from spring time onwards. Buds inserted in lemon trees in the spring—say up till November—could be started into growth the same summer, but those put into stone fruit trees under the conditions indicated above are best left dormant until the next spring. They are kept dormant by not cutting the stock off above the inserted buds.

PLOUGHING IN STUBBLE.

"Scrub Farmer" writes :—"Would you recommend ploughing in the stubble and not burning off in light sandy soil, a good deal of which is over limestone ?"

Reply—Neither on light sandy land nor on better soil is stubble burning, as a general practice, to be recommended. Further, light sandy soil will not stand frequent crops of wheat without an interval of rest, or, in the alternative, heavy manuring with a complete manure.

BLACK OLIVE SCALE ON ORANGE TREE.

"W. H. C." forwards an orange twig infested with black spots, and asks the cause and remedy.

Reply—The orange twig is infested with the insect called black olive scale (*Lecanium oleae*, Bern). It attacks nearly all kinds of trees and plants growing in gardens in this climate. Orange trees are most frequently affected whilst they are young and full of foliage, as the insect likes the shelter of dense growth. Such infested trees are also frequently covered with a black sooty incrustation, due to the presence of this scale. This sootiness is a mould fungus which grows upon the sweet, sticky exudations from the insects, and is not a parasite disease in itself ; hence if the scale insect be destroyed, the sootiness disappears in time. This pest, though difficult to eradicate, is easily held in check. As a preventive measure, the infested trees should be thinned out where the twigs are dense and crowded, so as to admit light and sun heat, and by occasionally applying a spraying with resin wash, or oil emulsion, the insects are reduced to harmlessness. These emulsions may be made from kerosine and soap, or some of the heavy red oils, which may be bought in a prepared form readily mixable with water.

DRAKE.

"W. H. G. Z.," Buccleuch, asks—(1) What is drake ? (2) To what extent is its presence in a wheat crop harmful ? (3) What precautions should be taken to prevent its appearance in a crop ? (4) What should be done to exterminate it ?

Reply—(1) "Drake" is a weed, namely, *Lolium temulentum*. (2) Its presence in a crop is harmful in that it takes the place and nutriment which

otherwise might be used by a crop, the same as is the case with any other weed. (3) The best precautions to prevent its appearance in the crop is to carefully grade the seed wheat. (4) The weed is best dealt with by thoroughly cultivating the fallow to kill the plants.

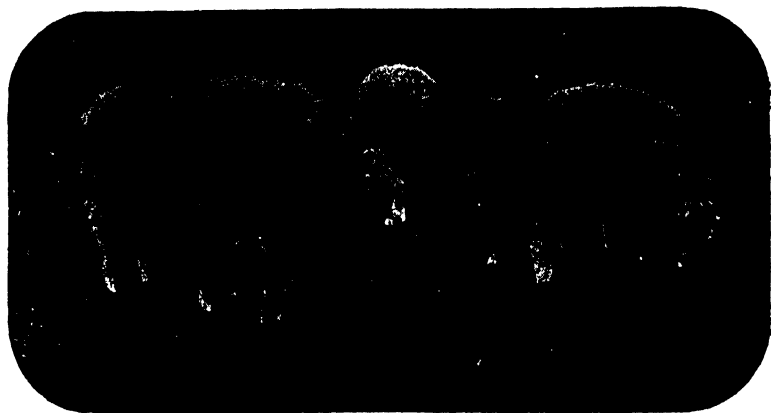
STOCK INQUIRIES.

(Replies supplied by Mr. F. E. PLACE, M.R.C.V.S., B.V.Sc., Veterinary Lecturer).

Dry, Brown Patches on Sheep.

A member of the Koppio Branch asks the cause of dry, brown patches which occur on the necks and backs of sheep. The wool on these patches is shrivelled and short. Sheep on scrub and heath country are most affected.

Reply—It would be well to send a patch or two to the Chief Inspector of Stock, as probably the sheep are ticky or lousy, although the patches may arise from other causes ; but whatever the cause, the remedy would probably be found in dipping with a reliable arsenic dip.



TAINTS IN MILK AND ITS PRODUCT.

By H. J. APPS, Dairy Officer.

(Continued from page 110, September issue).

The cleaner the strainer the freer the milk is from contamination. Certainly one of the most common sources of infection is the habit of wet milking. Less could be said about this practice were the udder and teats of the cow thoroughly cleaned; but such is rarely the case.

If the first few streams of milk from each teat were milked into a separate bucket it would vastly improve the keeping quality of the remainder, and in some instances lessen the possibility of introducing organisms that may lead to taints. The bitter taste often associated with milk may be attributable either to the food, organisms, or the cows having been in an advanced stage of lactation.

As previously stated, the contamination of milk occurs frequently, as it always contains a varying amount of germ life. The result of this infection is to cause milk or cream to become fermented, yet it is possible that milk may acquire an abnormal taint, such as is due to absorption, without undergoing any fermentative change; but the invasion of various forms of bacteria is so common that fermentative changes, due to living organisms, are constantly at work.

Milk may become tainted from ---(1) Absorbing bad odors. (2) The dust and dirt that may get into the milk during and after milking. (3) Rusty and unclean utensils. (4) Cows eating unsuitable feed. (5) Cows drinking impure water.

We are all familiar with the ordinary souring of milk, which is pronounced if the milk be allowed to remain for a few days under ordinary temperatures. This souring of milk is due to the formation of lactic acid, which is produced by the decomposition of the milk sugar. This class of bacteria develop in milk with great rapidity. In this fermentation the acidity or sourness begins to be evident to the taste when it reaches .25 per cent. lactic acid. Cream never develops as much acid as milk, because there is less milk sugar in the cream.

PASTEURISATION.

With badly tainted milk pasteurisation may be used to advantage. The pasteurisation of milk when properly carried out will keep the milk in sound

condition for, on an average, 24 hours longer than would otherwise be the case.

The system cannot be successfully employed in creams which have become decidedly off in flavor and high in acidity. With cream which is thin or low in butter-fat the pasteurising has a tendency to cause the casein to become coagulated, which materially increases the loss of butter-fat in the butter-milk; therefore, to minimise this trouble to a degree, it is expedient that the cream be heated to 180° F. rapidly.

It is not an agent to totally kill the putrefactive germs, but is only instrumental in checking their growth in the early stages. Its general adoption is hardly practicable in most of our factories, as the cream delivered in the warm months is of a varying condition. It can only be successfully carried out where freshly separated creams are received; thus I am of the opinion that a more rapid cooling of the cream is of more vital importance, especially in the case of creams high in acidity and temperature.

Pasteurisation involves more labor and expense. The general type of the pasteuriser is a large drum surrounded by a steam jacket, and containing a rotary fan or stirrer, which is driven by a belt. This is necessary in order to agitate the milk or cream and prevent it from becoming burnt. The milk or cream is admitted at the bottom of the machine, and when stirred by the fan is passed through the outlet at the top, in which is inserted a thermometer, thus enabling a constant eye to be kept on the temperature. The process requires a considerable amount of steam and cold water. Pasteurising cream eliminates in certain cases bad taints and enables the butter-maker to secure a sound material for inoculation with a starter or lactic ferment, with the result that he has the complete ripening process under his care. The general temperature employed is from 157° to 180° F.

The sudden souring of milk after pasteurisation is, in many cases, due to the imperfect cooling after the milk has been heated. It becomes necessary in using pasteurised cream to employ starters, or lactic acid ferments.

The greatest care must be taken to sterilise all utensils used for the propagation of a starter. The starter should not be allowed to become too cold, because putrefactive ferments are apt to gain the ascendancy. A good starter has a clean, pleasant, acid taste. It is most effective if used very soon after coagulation or thickening, or with an acidity of from .65 per cent. to .85 per cent. lactic acid.

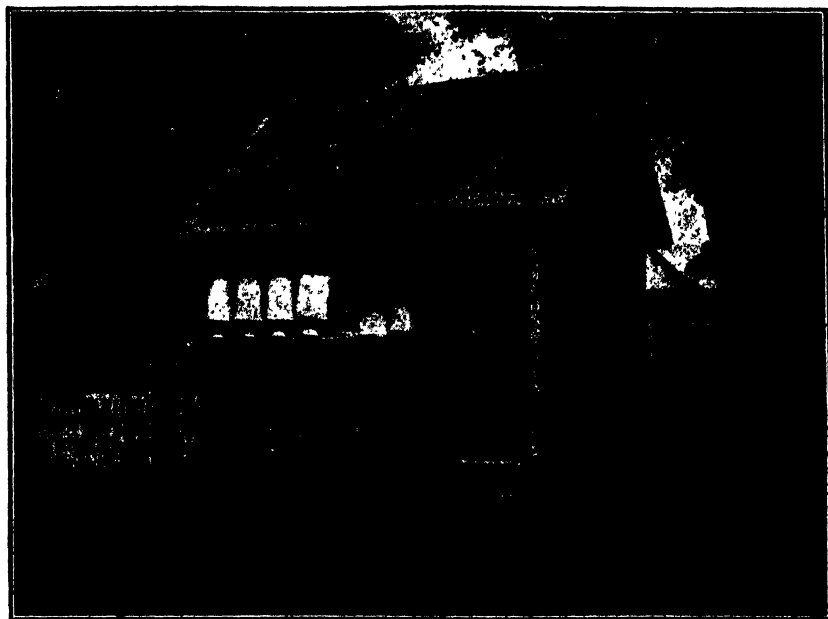
TO PREPARE A STARTER.

Take 4galls. of freshly separated milk sound in flavor and hold at a temperature of 180° F. for two hours, then rapidly cool to 90° and add your culture, either in the shape of liquid or powder form, and hold at a temperature of 88° F. This is allowed to stand until thickened in a sealed jar or vessel well covered with a cloth, which generally occupies from 18 to 24 hours, when it is ready to inoculate the pasteurised cream or milk. Sufficient

quantity of this starter, viz., about $\frac{1}{2}$ per cent., is used to propagate another 4galls. of pasteurised or sterilised milk, and such a procedure is carried on from day to day, until the starter shows signs of deterioration. Under ordinary conditions a starter should be sound for a period of from three to four weeks, at the end of which time a fresh starter should be made. The quantity of starter necessary for cream will vary from 5 per cent. to 12 per cent., depending upon the ripening or maturing temperature and the thickness, as regards butter-fat, of the cream.

THE ACIDIMETER.

By the use of the acidimeter one is enabled to regulate the ripening process, or the addition of a starter, in an intelligent manner. For the purpose of



A Cheap and Sanitary Milk House.

making the test a standard alkaline is used and kept in a well-stoppered bottle. A burette capable of holding 30c.c., a white dish, a 10c.c. pipette, a bottle of phenolphthalein indicator, and a glass stirring rod complete the outfit. The 10c.c. of milk or cream to be tested is measured into the white basin and two or three drops of the indicator is added.

The sodium hydrate or alkaline solution is now allowed to slowly drop into the basin containing the milk or cream, which is constantly stirred with the glass rod during the operation. The indicator give no color reaction in an acid medium, but as soon as sufficient of the alkaline solution has been

added to neutralise the acid, a pink tinge appears. The dropping of the solution is stopped immediately the pink color becomes permanent.

The number of c.c. of the solution, which is noted on the graduated burette, required to produce a pink color indicates the percentage of lactic acid present.

Have the solution of such a strength that 1 cubic centimetre will neutralise .01 grammes of lactic acid.

SEPARATING.

In some instances the butter possesses an over-ripe or sour flavor, besides being weak in body and greasy in texture ; this is due to the high temperature at which the cream has been churned. Again, the most vital point is confronted, namely, that of expelling the moisture from the granules of butter. It is always noticeable that butter churned at a high temperature is found to be saturated with free moisture, and another serious difficulty met with is the comparatively large loss of butter-fat, which is daily taking place where proper cooling facilities are not available.

As the warm weather is approaching farmers should alter the cream screw of the separator and aim at delivering cream testing from 40 per cent. to 45 per cent. of butter-fat. It is no uncommon occurrence to find creams delivered with tests varying from 25 per cent. to 60 per cent. If cream is leaving the separator low in butter-fat it is either due to the cream screw not being properly adjusted, not sufficient speed, milk not being at the right temperature, inflow greater than the capacity of the machine, or through allowing too much milk to pass through the machine as the speed is decreasing, in order to flush it out. It is imperative for best results that freshly separated cream should not be mixed with a previous separation until at least from six to eight hours. Warm cream mixed with old cream will spoil the whole product, and even should the cream be cooled sufficiently the previous separated cream will cause the fresh lot to increase in acidity.

It has been proved beyond doubt that nearly all the chemical and bacteriological changes in cream take place in the milky parts, therefore the richer the cream the better it will keep, other conditions being the same. By separating a fairly rich cream there is less expense in cost of transportation, as cream is more valuable than milk. The three cardinal points to observe are --clean cream, cool cream, and fairly rich cream, which tell the secret of producing a good cream.

One of the conspicuous features of the present system of transportation on the railway, by coach, and ordinary farm conveyances is the prevalence of allowing the cans to become exposed to the rays of the sun. When such conditions exist it tends to produce a butter possessing a tallowy flavor.

GROCCERS' AND ALLIED TRADES' EXHIBITION, LONDON.

The following report on the South Australian exhibit at the Grocers' and Allied Trades' Exhibition, held in London in September, has been received from the Trade Commissioner :—

The London Grocers' Exhibition was opened at the Agricultural Hall, Islington, on Saturday, September 21st. The South Australian exhibit occupied a space of 60ft. x 16ft. in a prominent position in the hall. As usual, owing to the fact that this is essentially a trade exhibition, the attendance of the general public was not large ; but, what is more important to South Australian producers, the "trade" attended in large numbers, especially on the Wednesday and Thursday (early closing days), when at times it was difficult to walk about, owing to the crowds. Excursion trains were run from almost every part of the United Kingdom.

Posters were in evidence at all the principal railway stations, upon which the State of South Australia was brought well to the fore. In addition to occupying a prominent position in the ordinary posters, the notice in regard to South Australian produce was most prominent on the monster placards that were pasted up outside the hall.

Not only the South Australian exhibits but our methods of promoting the sale of the various lines shown were most eulogistically spoken of on all sides by visitors and the press. In almost every instance I was in a position to inform the "trade" where the various products were to be purchased in London, wholesale, and the public where they were to be obtained retail.

Wine.—The prominence we give to the various brands of South Australian wines that are on the English market is a source of gratification to the proprietors, who are fully alive to the importance of trade exhibitions as a medium for further introducing their wines to the "trade" and the public.

Apples.—In addition to showing the usual plate of exhibits of apples we also had the original package on view. While speaking of original packages I should like to take this opportunity of again sounding a warning note in regard to deviating from the present package, as I understand has been suggested. I intend, however, to deal with this question very fully in a separate report. South Australian apples being out of season, I was unable to specify any particular store where they were obtainable at the present, but on the cards over the exhibits the public were notified that South Australian apples were procurable at all leading fruit stores during the season (April to June).

Lambs' Tongues.—Learning that a Bristol firm still held some 60 cases of lambs' tongues that were packed at the Government Works, Port Adelaide,

I put a London wholesale house in touch with them, with the result that a deal was made and I was in a position to notify the "trade" that the tongues on show were also procurable in London. This wider distribution should assist me in getting a better offer when next the department has a further lot available for shipment.

Honey.—Owing to the method we have adopted of exhibiting honey, viz., arranging the jars on a skeleton stand with electric lights inside, it always proves a most attractive feature of the show. Unfortunately, I was not in a position to offer to the trade generally; but, as several of the large retail establishments in London still hold a small stock, I was in a position to refer the public to them. It is not my intention at any time to withdraw this line from the shows; because, although the supply at the moment is nil, I am convinced that sooner or later this market will again be required to relieve the local market, and accordingly I am of opinion that it would be a great mistake to withdraw it.

Eucalyptus Oil.—The trophy supplied by Messrs. F. H. Faulding & Company was an innovation to the stand, and from the results obtained I am convinced the firm will not regret their enterprise in taking advantage of the opportunity offered to them. Due to the fact that this particular brand was to be exhibited on the Government stand at the Grocers' Exhibition, Messrs. Faulding's representative in London was able to induce four of the largest retail emporiums in London to carry stock.

Dried and Bottled Fruits.—The dried and bottled fruits, together with the apples, occupied the centre of the stand, and was admitted to be the most attractive exhibit in the whole of this important exhibition. In connection with the exhibit I took the opportunity of again giving to the trade and the public full instructions in regard to the correct method of preserving dried apricots for desert purposes, also for jam making. With a view of carrying out my propaganda, some weeks before the exhibition was to be opened I approached some of the representatives of Adelaide firms in London whom I knew usually sold the fruit in London on account of the growers. I explained the methods I intended introducing, and suggested if I were enabled to carry them out it would be a good thing for the industry in South Australia. I also pointed out that without some stock to work on it would be useless to attempt my scheme. I regret to say that I failed to get any encouragement from these sources. Accordingly, sooner than let such an excellent opportunity go by of proving to the trade the superior quality of South Australian sun-dried apricots over those of other countries, I approached Messrs. Joseph Travers, Limited, the well-known wholesale merchants in London, who I knew held stocks of South Australian fruit. I explained my idea to them, when they at once fell in with my views and offered me every possible assistance. Messrs. Travers supplied me with a considerable list of retail establishments to whom they had sold South Australian fruit,

and who, in consideration of the fact that their names would be mentioned on a list given away at the exhibition, undertook to give South Australian dried apricots full prominence in their shops. Having the above in view, I had a quantity of circulars printed and distributed them from the stand in the exhibition, mentioning where the goods could be obtained. In order to further convince the public that jam of excellent color and flavor could be made from the dried fruit at a small cost, I had some jam made from the dried fruit and placed it alongside the general exhibit.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held at Roseworthy College on Wednesday, November 13th, on the occasion of the annual visit of the Board. There were present the Chairman, Mr. A. M. Dawkins, Mr. G. R. Laffer, Professors W. Lowrie and A. J. Perkins, Messrs. F. Coleman, G. F. Cleland, C. J. Valentine, C. E. Birks, and G. G. Nicholls (Secretary).

After inspecting the crops, experimental plots, &c., the necessary business of the Board was dealt with as follows :—

TWO NEW BRANCHES.

The formation of Branches of the Bureau was approved at Goode with the following gentlemen as members :—Messrs. E. A. C. Lutz, C. P. L. and K. H. L. Will, Wm. Burner, W. Folland, A. B. Geue, S. O. McPherson, J. G. Rohrlach, V. J. Tonkin, L. B. Hughes, W. G. Morcombe, S. W. Broadfoot ; and at Julia, with the following members :—T. Prior, D. S. Heaslip, A. and O. B. Pfitzner, J. G. Reuther, W. and P. H. Copley, J. Jaffer, W. Paterson, H. B. Martin, H. B. Traeger, J. McRitchie, R. A. and W. H. Neal, W. Hall, T. Brown, T. Neylon, T. Carter, D. Hombsch, and G. Gaerth.

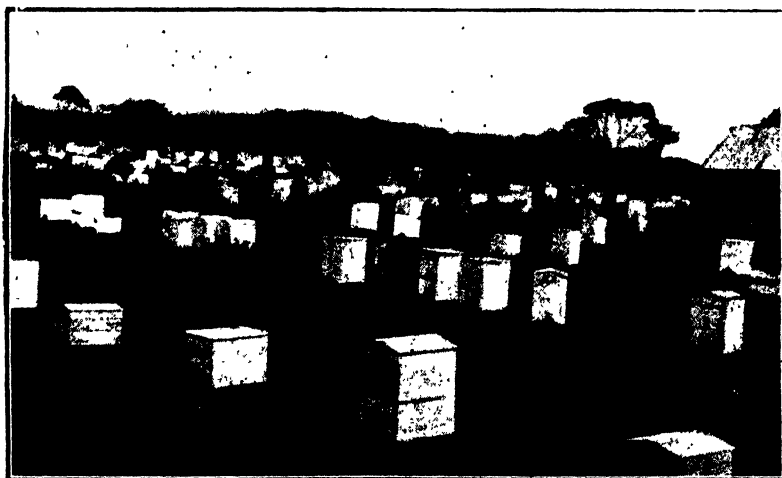
NEW MEMBERS.

The following gentlemen were appointed as members of the undermentioned Branches, viz. :—Monarto South—R. B. Thiele ; Elbow Hill—A. McCallum ;

Petina—W. S. O'Grady ; Renmark—E. Williams, B. H. B. Williams, W. E. Snow ; Meadows—J. H. Williams, W. Milligan, F. Vickery, E. Vickery, T. Usher ; Millicent—G. Major ; Redhill—D. Robertson, T. H. Treloar, F. Jackson, C. Campbell, W. J. Button, W. Hayes ; Longwood—C. J. Phillips ; Forster—W. G. Retallack, J. Simms, J. Stone, W. C. Retallack, A. Schmall, G. White ; Moonta—A. B. Fergusson, P. Ford, J. Beaglehole ; Coorabie—O. Grimes, S. Shields, D. G. Roberts, A. Winter, V. R. Hardy, E. J. Stretton ; Amyton—A. J. Phillis ; Moonta—L. Howlett, Jas. Bowden, A. Bowey, P. Bowey, F. Symons ; Balaklava—P. H. Shepherd ; Clanfield—R. Correll ; Orroroo—E. Turley, J. M. Cadzow, L. Judell, W. H. Roberts, J. R. Chapman, H. Chapman ; Renmark—J. N. McDougall, H. S. Pike ; Hooper—G. Masson ; Crystal Brook—W. W. Forgan, J. H. Dingle ; Mount Remarkable—C. Yates, G. Yates, jun., E. Mayne, R. G. Fiebig ; Glencoe—J. T. Halliday, H. Halliday, A. Haines ; Monarto South—J. Hutton ; Wirrabara—H. P. Greenshields ; Riverton—T. Penny, T. Camac, T. Hall ; Mount Bryan—A. Woodgate, B. H. Woodgate, A. A. Jeffries ; Yandarie—A. Preiss ; Yallunda—G. A. Teakle ; Clarendon—J. Potter, J. R. Nicolle, H. G. Rowley, W. B. Burpee ; Meningie—A. G. Williams, F. W. Newson ; Northfield—E. Kester ; Hawker—A. E. Hirsch, P. P. Feineler.

LIFE MEMBERS.

The undermentioned gentlemen were appointed life members in recognition of 20 years or more consistent and useful membership in the Agricultural Bureau :—Lucindale Branch—Messrs. E. F. Feuerheerd and H. Langberg ; Carrieton—Mr. W. J. Gleeson ; Colton—Messrs. P. P. Kenny, R. Hull, and M. S. W. Kenny ; Narridy—Mr. H. Nicholls.



Charlton Apiary, Eyre Peninsula.

THE PRACTICAL VALUE OF A SOIL ANALYSIS.

(From *The Journal of the British Board of Agriculture.*)

Inquiries are frequently received by the Board from farmers and gardeners who wish to be informed where they can have soils analysed. In most cases the idea appears to be entertained that having a soil analysed is a ready means of determining its manurial requirements, or of obtaining an indication of its fertility. A brief discussion as to how far this view is correct may therefore not be out of place. Take, first, the broad question—to what extent does an analysis of a soil give an indication of that soil's fertility?

The fertility of a soil may be defined as its power of growing crops, and it is obvious that while this depends to a great extent on the soil's ability to supply the crop with what is often termed plant food—in particular, nitrogen, phosphate, and potash—in a suitable form, this is by no means the only essential condition. A sufficient and continuous supply of water to the roots, and proper aeration of the soil, are quite as necessary for satisfactory growth as the supply of manurial ingredients. To a very great extent these factors are regulated by circumstances of climate, exposure, drainage, and depth of soil, which obviously cannot be determined in the laboratory. Even if the analyst could give complete information about the plant food, and were able to measure accurately the mechanical condition (*i.e.*, texture) of the soil, and to correlate it exactly with the questions of aeration, drainage, and water supply, the information obtained in the laboratory could only give a very incomplete idea as to the fertility of any particular field, and the farmer would have to supplement it by his local knowledge, experience, and judgment.

Unfortunately, however, the analyst cannot at present give more than very rough and incomplete information even about those factors influencing fertility which lie within his province. Some of the difficulties with which he has to contend may be mentioned here. He can determine as accurately as need be the total amounts of nitrogen, phosphates, and potash in the soil, but it has been found that, even where external factors such as climate, depth of soil, &c., do not enter into the case, there is often little or no connection between these amounts and the soil's fertility or its manurial requirements. Any ordinary soil contains much more total plant food of all forms than a single crop of any kind can possibly require. Most of this plant food, however, is in an unavailable or locked-up condition, and is only gradually set free or made available, the rate varying in different cases. As the plant

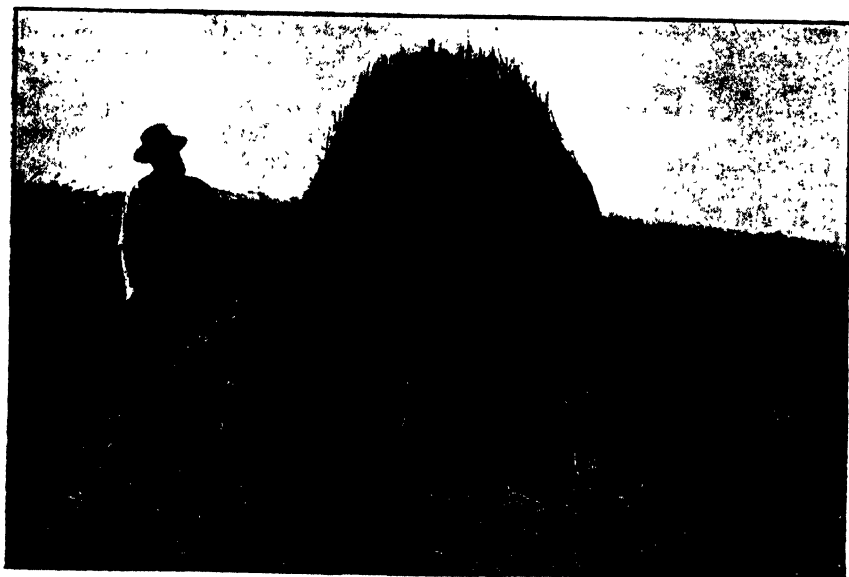
can only make use of the free or available food, it is very easy to see that it is quite possible for one soil, containing quite small amounts of the manurial substances, to produce better crops than another soil containing large quantities, if for any reason the first soil gives up its material to the plant at a more rapid rate than the second. In fact, many soils contain very large quantities of, say, phosphates, and still respond most readily to small dressings of manures containing available phosphate, because practically all that is already in the soil is unavailable, and, as far as the plant is concerned, might almost as well not be there at all. (It may be remarked that exposure to air and weather, and treatment which secures a healthy condition of soil, are some of the factors which determine the rate at which plant food becomes available in the soil, so that, apart from their other important functions, good cultivation, draining, and liming may partly take the place of manuring in a soil which contains large stores of locked-up food.)

In the case of phosphates and potash, a method has been devised of roughly measuring the amount which may be regarded as of immediate or prospective value to the plant, by finding, not the total amount of phosphate or potash present, but the amount which is dissolved out in a given time by a weak solution of citric acid. This method gives results which in many cases indicate fairly well whether a particular soil will respond to applications of either of the two kinds of manure, and may be used in comparing soils of the same class. At the same time there are many cases where the results obtained are at variance with those obtained by actual experiment in the field. So far, no ready method has been discovered by which the availability of the nitrogen in the soil can be estimated except as regards the small amount present in the form of nitrates or of ammonium salts.

As already mentioned, two conditions essential for the satisfactory growth of crops are a sufficient supply of water and the proper aeration of the soil. To a great extent the ability of the soil to meet the plant's requirements in these respects is determined by the size and nature of the particles of which the soil is composed. By carrying out a "mechanical analysis," the proportions of particles of different degrees of coarseness can be measured, and as the results of such analyses accumulate, it will probably become possible to estimate from such an analysis such factors as water-retaining power, ease of drainage, ability to withstand prolonged drought, and so forth, and even to say with some degree of certainty what systems of cultivation are most likely to result in a good tilth at any particular time of year. At present, however, such an analysis is tedious and expensive, and in most cases an experienced farmer would be able to gain more useful and accurate information by walking over the land and examining it carefully at different times of the year.

On the whole, in the present state of our knowledge, it must be concluded (1) that chemical and mechanical analyses of soils are of little practical value except in a few special cases ; (2) that an intelligent and experienced local farmer could give a much better idea of the fertility of any particular farm or field than an analyst ; and (3) that as a means of determining the manurial requirements of a soil a simple field experiment gives more accurate and reliable knowledge than ordinary analyses.

In certain special cases, however, soil analyses may undoubtedly be of great practical value, *e.g.*, (1) by a very simple test, which most farmers could carry out for themselves, it is possible to say whether a soil is in need of liming or not ; (2) if, by means of a soil survey, such as those now being carried out in many parts of the country, complete information has been obtained with regard to some special class of soil occurring in a limited area, different samples of that particular soil can be compared and classified fairly accurately, and their manurial and cultural requirements predicted with a considerable degree of certainty.



THE WHEAT CROP.

Official Forecast: Probable Average, 9'03 Bushels.

The official estimate of the wheat and hay harvest for the season 1912-13 was issued by the Government Statist (Mr. L. H. Sholl, C.M.G.,) on Wednesday, November 27th. The actual figures for the past season and the estimated ones for the present season are given in detail in the following pages. In the table below the official totals for the State are shown, together with the estimates of *The Advertiser* and *The Register*.

	Government Statist, Nov. 28th, 1912.	<i>The Advertiser</i> , Nov. 14th, 1912.	<i>The Register</i> , Nov. 19th, 1912.
	Acres.	Acres.	Acres.
Area under crop	2,658,715	2,601,853	2,701,131
Area to be reaped for wheat	2,229,890	2,181,853	2,225,253
Area to be cut for hay	428,825	420,000	475,878
	Bushels.	Bushels.	Bushels.
Aggregate wheat yield	20,137,870	19,409,592	19,893,761
Average per acre	9'03	8'53	8'94
	Tons.	Tons.	Tons.
Aggregate hay yield	457,290	—	465,646
Average per acre	1'07	—	19'57cwt.

The general character and lateness of the season made the work of the chief clerk (Mr. W. L. Johnston) and other officials of the Statistical Department more than usually difficult. The climatic conditions for the early months of the season, March to May, states the Government Statist, could not have been worse. Good general rain fell in June, and favorable conditions continued for July and the greater part of August. September and October were distinctly unfavorable. The rainfall was patchy and in most centres below the average, but the late sown crops were wonderfully revived by the exceptionally fine general rains which fell in November. The report shows that the total acreage under crop is 66,285 acres more than last season, and that the estimated production of grain is less by 214,850 bushels; and of hay less by 18,492 tons than in 1911-12. A decrease in the average yield of grain is anticipated for all the divisions of the State with the exception of the South-Eastern, the estimated average being 9'03 bushels as against 9'29 last year.

The following table shows the estimated averages per acre for each division in comparison with the actual for the previous season:—

Division.	Averages per Acre.	
	Grain. Bushels.	Hay. Tons.
Central	9'40 (10'12)	1'16 (1'31)
Lower North	11'83 (12'47)	1'16 (1'29)
Upper North	6'48 (7'09)	0'87 (0'94)
South-Eastern	8'47 (5'10)	0'93 (0'77)
Western	6'80 (7'87)	0'70 (0'87)
The State	9'03 (9'29)	1'07 (1'18)

ESTIMATE OF THE WHEAT HARVEST, 1912-13.

Estimate of the Area under Wheat, and the Probable Yield of Grain and Hay for the Season 1912-13, also the Actual Area and Yield for the Season 1911-12.

Countries.	Area Under Wheat.				Yield.				Average Grain per Acre	
	Actual Area, 1911-12.		Estimated Area, 1912-13.		Actual, 1911-12.		Estimated, 1912-13.		Actual, 1911-12.	Estimated 1912-13.
	Total.	Hay.	Total.	Grain.	Hay.	Grain.	Hay.	Grain.		
	Acres.	Acres.	Acres.	Acres.	Acres.	Bushels.	Tons.	Bushels.	Bushels.	Bushels.
I. CENTRAL—										
Adelaide	52,203	41,304	52,420	11,500	46,920	133,967	65,282	129,700	12-29	11-28
Albert	84,155	75,115	88,500	78,500	10,000	378,324	5,086	520,200	7-04	6-63
Alfred	62,297	54,536	74,400	64,800	9,600	409,998	6,297	539,750	7-52	8-33
Carnarvon	2,040	1,695	1,750	1,500	250	9,882	306	8,500	5-83	5-67
Eyre	71,937	61,848	70,710	59,300	11,410	437,912	8,845	350,200	7-08	5-91
Fergusson	155,937	143,639	154,650	141,550	13,100	1,794,806	14,993	1,610,470	12-50	11-38
Gawler	152,427	115,921	152,500	113,500	39,000	1,406,131	51,688	1,294,500	12-13	11-41
Hindmarsh	25,677	17,347	24,000	16,500	7,500	154,250	10,030	117,250	8-89	7-11
Light	137,201	91,401	135,760	89,700	46,060	1,308,568	69,109	1,086,970	14-32	12-12
Sturt	77,600	63,523	76,120	62,800	13,320	401,857	11,623	354,800	6-33	5-65
Total	821,474	635,924	830,810	639,650	191,160	6,435,695	243,259	6,012,340	10-12	9-40
Increase + or Decrease —	—	—	+9,336	+3,726	+5,610	—	—	-423,355	—	-0-72
II. LOWER NORTH—										
Burra	32,184	26,542	31,800	25,300	6,500	308,272	6,037	324,050	11-61	12-81
Daly	237,775	212,894	234,430	204,800	29,630	2,422,691	28,921	2,064,500	11-38	10-08
Hamley	858	658	1,000	200	800	600	342	1,400	3-00	7-00
Kimberley	17,460	15,038	16,840	14,550	2,290	96,910	1,458	105,500	6-41	7-25
Stanley	212,696	180,785	215,000	179,700	35,300	2,505,816	46,230	2,262,000	13-86	12-59
Victoria	176,575	137,915	184,250	141,000	43,250	1,867,618	52,037	1,968,750	13-54	13-96
Young	6,420	6,045	7,000	6,500	500	25,491	233	39,000	4-22	6-00
Total	683,968	579,419	690,320	572,050	118,270	7,227,398	135,258	6,765,200	12-47	11-83
Increase + or Decrease —	—	—	+6,352	-7,369	+13,721	—	—	-462,198	—	-0-64

ESTIMATE OF THE WHEAT HARVEST, 1912-13—continued.

Estimate of the Area under Wheat, and the Probable Yield of Grain and Hay for the Season 1912-13, also the Actual Area and Yield for Season 1911-12 continued.

Counties.	Area under Wheat.				Yield.				Average Grain per Acre.
	Actual Area, 1911-12.		Estimated Area, 1912-13.		Actual, 1911-12.		Estimated, 1912-13.		
	Total.	Grain.	Hay.	Total.	Grain.	Hay.	Grain.	Hay.	
	Acres.	Acres.	Acres.	Acres.	Acres.	Tons.	Bushels.	Tons.	
III. UPPER NORTH—									
Blackford	9,619	9,214	405	8,300	7,700	600	20,434	96	270
Dalhousie	98,391	80,697	17,694	92,150	75,700	16,450	706,374	18,970	17,120
Derby	—	—	—	—	—	—	—	—	—
Frome	130,930	112,043	18,887	121,680	101,520	20,160	905,319	17,977	15,160
Granville	15,046	14,188	858	12,200	11,700	500	36,411	343	140
Hanson	23,763	23,196	567	25,100	24,500	600	67,850	211	270
Herbert	10,954	9,973	981	11,650	10,650	1,000	95,363	1,054	880
Lytton	20	—	20	—	—	—	—	20	—
Newcastle	26,063	22,588	3,475	24,030	21,200	2,830	96,881	1,583	2,780
Taunton	165	115	50	40	180	30	—	—	20
Total	314,951	272,014	42,937	295,150	252,970	42,180	1,928,812	40,284	36,640
Increase + or Decrease —	—	—	—	-19,801	-19,044	-757	—	—	-3,644
IV. SOUTH-EASTERN—									
Buclench	54,670	51,650	3,020	73,200	67,600	5,600	175,400	1,649	3,660
Buckingham	33,001	30,223	2,778	38,400	34,920	3,480	270,988	2,353	3,310
Cardwell	4,722	4,535	187	6,900	5,600	1,300	14,922	86	900
Chandos	163,224	151,200	12,024	171,000	156,400	14,600	753,538	8,791	13,770
Grey	4,634	3,190	1,444	5,510	3,610	1,900	40,373	1,863	3,140
MacDonnell	7,043	5,870	1,173	8,150	6,260	1,890	48,637	1,127	2,120
Robe	8,821	7,344	1,477	10,040	8,270	1,770	69,700	1,567	2,600
Russell	29,892	26,849	3,043	32,100	28,400	3,700	122,575	1,931	2,280
Total	306,007	280,861	25,146	345,300	311,060	34,240	1,433,139	49,367	31,780
Increase + or Decrease —	—	—	—	+39,293	+30,199	+9,094	—	—	+12,413

V. WESTERN—													
Buxton	299	86	213	600	500	400	116	127	1,400	200	286	700	
Infurfin	11,958	11,173	785	13,970	12,460	1,070	76,923	697	93,700	790	688	726	
Flinders	88,261	79,574	8,687	95,550	85,780	9,770	610,007	8,874	621,460	10,170	767	724	
Hopetoun	13,986	12,957	1,029	15,820	14,500	1,320	125,391	884	77,900	810	968	537	
Jervois	140,667	125,166	15,501	149,670	136,350	13,320	946,42	13,370	895,350	8,550	756	657	
Kintore	25,110	23,082	2,028	27,000	26,000	2,000	178,500	1,358	130,000	1,000	773	500	
Le Hunte	600	420	180	550	300	250	11,000	132	2,700	190	1095	900	
Manchester	195	130	65	220	160	60	900	16	350	25	692	219	
Mudgeave	29,282	24,915	4,367	31,660	26,960	4,700	219,541	3,899	226,960	3,070	881	842	
Robinson	65,708	60,858	4,850	68,450	63,460	4,990	567,537	4,382	520,900	3,220	933	830	
Way	89,476	83,787	5,689	91,470	80,400	5,070	593,689	3,796	501,120	2,080	709	580	
York	488	416	72	1,175	1,150	25	3,900	79	9,200	15	938	800	
Total	466,030	422,564	43,466	497,135	454,160	42,975	3,327,676	37,614	3,087,040	30,120	787	680	
Increase + or Decrease —	—	—	—	+ 31,105	+ 31,596	— 491	—	—	— 240,636	— 7,494	—	— 107	
SUMMARY.													
I. CENTRAL	821,474	635,924	185,550	830,810	639,650	191,160	6,435,695	243,259	6,012,340	221,710	1012	940	
II. LOWER NORTH	683,968	579,419	104,549	690,320	572,050	118,270	7,227,398	135,258	6,765,200	137,040	1247	1183	
III. UPPER NORTH	314,951	272,014	42,937	295,150	252,970	42,180	1,928,812	40,284	1,638,920	36,640	709	648	
IV. SOUTH-EASTERN ..	306,007	280,861	25,146	345,300	311,060	34,240	1,433,139	19,367	2,634,370	31,780	510	847	
V. WESTERN	466,030	422,564	43,466	497,135	454,160	42,975	3,327,676	37,614	3,087,040	30,120	787	680	
Grand Total ..	2,592,430	2,190,782	401,648	2,658,715	2,229,890	428,825	20,352,720	475,782	20,137,870	457,290	929	903	
Increase	—	—	—	66,285	39,108	27,177	—	—	—	—	—	—	
Decrease	—	—	—	—	—	—	—	—	214,850	18,492	—	026	

L. H. SNOLL, Government Statist.

Statistical Office, November 27th, 1912.

AUSTRALASIAN FRUIT-GROWERS' ANNUAL CONFERENCE.

Report by MR. G. QUINN, Horticultural Instructor.

The Horticultural Instructor (Mr. G. Quinn) has forwarded to the Director of Agriculture the following report on the proceedings at the Annual Conference of Australasian Fruitgrowers, held at Sydney, New South Wales, on October 21st-25th, 1912 :—

“Delegates to the Conference were sent by fruitgrowers' associations in all of the States of the Commonwealth, and a representative from those of New Zealand was also present. Four of the State Agricultural Departments, viz., those of Tasmania, Victoria, New South Wales, and South Australia sent an official belonging to their respective horticultural sections. The agenda paper was a long one, no less than 30 motions, or amendments to motions being discussed and voted upon. Although the official visitors were given no actual status in the deliberations, we were able, in many respects, to correct misconceptions respecting the official attitude adopted toward questions of interest to fruitgrowers in the various States. Outside of assisting in this manner, when requested by the gathering, it was our object to try and feel the pulse, as it were, of the Conference, and to arrive at conclusions regarding the aspirations and various objectives which appeared to reveal themselves through the discussions.

SEA CARRIAGE OF FRUIT.

“Among the multitude of motions one fact seems to stand out most prominently, and this related to the defective carriage or transport of fruit, chiefly by sea. These discussions laid stress upon facts which have been pretty well known for some time in official circles in the different States. The motions submitted showed very clearly that this drawback existed equally in the Australasian coastal, as well as the European oversea services.

“In respect to the transport of fruit around the coasts a splendid demonstration has been given by the A.U.S.N. Co. in the carrying of bananas from Fiji to Sydney and Melbourne. This company has fitted up the s.s. *Levuka* with appropriate bulkheads, brine coils, and electrically-driven fans to ensure a cooled-air circulation, and bananas are carried in an absolutely perfect condition from Fiji to Melbourne, whence they are driving the Queensland grown banana out of the southern markets. Through the courtesy of the officer in charge I inspected this boat, when 33,000 bunches (equalling about 11,000 crates) had just been landed in Melbourne from Fiji with less waste than when

the average coastal steamer lands 200 cases of Queensland bananas in Adelaide. There is no question whatever, that unless the coasting steamship companies adopt a similarly effective method of carrying the fruit the banana-growing industry of Queensland must collapse, owing to the heavy losses incurred. It is to be hoped that their monetary interest in this trade will cause these companies to grapple with the difficulty before the business has entirely gone into the hands of the people who supply a better article from outside sources. These are results which stand out most threateningly, notwithstanding the increased duty placed by the Commonwealth Government upon imported bananas during the year—an increase, it may be mentioned, which was granted at the request of the Fruitgrowers' Conference, held in Queensland a year ago. In our own experience the percentages of over-ripe, or prematurely ripened, or softened bananas in almost every consignment, not only increase the price, and consequently restrict the purchasing of this fruit, but dishearten the grower in Queensland, as well as cause him to imagine the inspectors are unduly severe in rejecting the produce at this end. Ten per cent. is not an infrequent quantity of rejects, and at certain periods of the year even 30 per cent. and 40 per cent. have been found rotten or softened beyond recovery on arrival at Port Adelaide.

“The dissatisfaction in respect to the European trade found expression in a request for the installing of self-registering thermometers in all cargoes of export fruit.

“It would appear as if the consummation of this wish may possibly give some direct evidence of the fluctuations of temperature permitted in the insulated holds during the voyage, but granted these instruments are adopted, there are yet many difficulties. In the discussion upon this subject the recapitulation of experience by members of the Conference proved abundantly that cargoes of fruit—even as tender as William's Bon Chretien pears—can be safely carried to Europe, and it was pointed out to the Conference that until redress for losses sustained by shippers through the lack of care on the voyage was made readily obtainable in Australian courts of law, the shipping companies would doubtless proceed along the lines followed hitherto.

“In my opinion the best assistance the Commonwealth can render the fruit-exporting industry in this connection lies in the direction of protecting the shipper against himself by forbidding the export of any fruit deemed through any cause unfit for the voyage, and at the same time undertaking to compel the companies trading to Commonwealth ports observing such care of the fruit during transport as modern refrigeration has proved to be possible. Unless something of this sort can be done, the whole of the fruit shippers throughout the Commonwealth must needs unite to fight for fair treatment, or the industry will languish. Assuming any such action be taken, freights may rise; but better higher freights and safe carriage than low freights and frequent losses.

THE FRUITGROWER AND THE TARIFF.

"The oppressive character of the tariff as it affects the fruitgrower came in for much condemnation, and, like all other sections of the community, these delegates considered they should be relieved of such burdens. It is not for me to question these conclusions, but subsequent discussions in relation to imported lemons and the recalling of the action of the Conference last year over the bananas question raised a suspicion of inconsistency.

"There was, however, in the discussions upon trade with other parts, a strongly-expressed desire to reciprocate with Canada and the United States, from whence imports of apples are now becoming a regular and increasing item of trade. It was complained that the U.S.A. tariff was decidedly against a return trade on an even footing, but the possibilities on both sides were good, owing to the diverse seasons existing in the two countries. To foster this trade a motion requesting the Commonwealth Government to put up an attractive exhibit at the proposed Panama Exposition was carried unanimously.

SECONDHAND CASES.

"The use of secondhand fruit cases in the inter-State trade revealed a diversity of opinions, apparently based on how it suited the interests of the different States. The delegates from Tasmania and Queensland—the principal case timber-producing States—strongly deprecated the use of secondhand cases, and on a vote the motion in favor of their use secured only seven against five votes.

NOMENCLATURE OF FRUIT.

"The correct nomenclature of fruit, more especially in leading lines of export, such as apples and pears, received some attention, and it was resolved to form a pomological committee in each State, consisting of two fruitgrowers elected—not by their associations, but by the dominant association—and a State official to attempt to correct the confusion now existing. One can foresee a long road ahead of the adoption of any such a committee's conclusions unless some legal status can be given its decisions—a result discussed and discounted by some of the delegates.

"The existing anomalies regarding the naming of the export varieties of apples and pears are not numerous, and the officials present sought to bring the matter into active operation whilst the Conference sat; and to this end the fruit section of the Department of Agriculture in Sydney, at considerable trouble, brought before the Conference a large and well-preserved collection of cool-stored fruits, of apple and pear, but the Conference had spent its energies largely in talk, the question was shelved, and an opportunity lost for at least a year.

SPRAYING.

"The control of spraying materials by the various State Governments was urged on the lines of actual applications of all reputed remedies for plant diseases as against chemical tests, and without an adequate knowledge of the time and expense the motion really involved, or the difficulties to be surmounted, by a vote of seven to six, it was resolved the various State Governments should be asked to test every 'cure all' for plant troubles brought forward by all and sundry, and pronounce upon the same with the forces of the law.

STATE CONTROL OF FRUIT EXPORTS.

"The question of State control of fruit exports was brought forward and vigorously discussed. By the casting vote of the Chairman it was thrown aside as something not even safe to be entrusted to the judgment of the growers' associations in any State. The fact that this course was most strongly suggested by delegates who had great personal interests to serve in keeping the matter out of Government control, and at the same time had no actual experience of what a Government department can do for the producer, must 'give us pause' for reflection before agreeing.

OTHER QUESTIONS.

"Other matters dealt with consisted of affirming resolutions of the Conference of last year respecting standard fruit cases, requesting the State Governments to convene a conference of refrigerating experts to advise on the best conditions to secure safe oversea carriage of fruit, urging the uniformity of railway gauges, and the use of cool cars on State railways for the inter-State transport of fruit, the compulsory registration of nurseries, and the encouragement of all reasonable means of securing fruit to the public at a cheaper rate.

CONCLUSION.

"Through the courtesy of the New South Wales Fruitgrowers' Associations I had an opportunity of visiting, in company with other delegates, the districts of Paramatta, Dural, Galston, Glenorie, Carlingford, and Epping, and inspecting many of the fine citrus orchards situate there. The Government of New South Wales also afforded the delegates and visitors an opportunity of visiting the Hawkesbury Agricultural College, at Richmond, and observing the various horticultural and other operations carried on at the institut on.'

KYBYBOLITE EXPERIMENTAL FARM.

FARMERS' VISIT OF INSPECTION.

In view of the large extent of country where similar problems of drainage and sweetening the soil have to be solved, particular interest attaches to the work being done under the superintendence of Mr. W. J. Colebatch, B.Sc., at the Kybybolite Experimental Farm. That this is generally recognised was demonstrated on Friday, November 22nd, when nearly 200 farmers, some of whom had journeyed by rail nearly 100 miles and others had driven nearly 50 miles, attended at the farm to inspect the crops and the operations generally. Included among the other visitors were the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), the Director of Agriculture (Mr. Wm. Lowrie, M.A., B.Sc.), the Horticultural Expert (Mr. G. Quinn), the Poultry Expert (Mr. D. F. Laurie), and the Director of Agriculture in Southern Rhodesia (Dr. E. A. Nobbs). Copies of some "Notes and Comments" upon the crops in the various fields, the treatment of the land, and the nature of the experiments, which had been prepared by Mr. Colebatch, were distributed prior to the inspection, and proved of material assistance in following his remarks during the tour of the farm.

PREPARATION AND DISPOSAL OF LAND.

It was pointed out that during the two years since the previous farmers' day, the line of progress had lain chiefly in the direction of more thorough and extended surface drainage, and in the acquirement of more definite information relatively to the methods of cultivation best suited to the district, and the proper times to carry them out. Of the 20 odd paddocks on the home farm there were only three comparatively small ones sufficiently free from timber to render possible their use for continuous experiments. One of these was otherwise unsuitable, and one has been surveyed and fenced off into blocks of approximately half an acre, to be utilised for experiments to test the value of different methods of fallowing. Clearing and burning had been conducted persistently, and a start had been made with the netting of the boundary lines. Many miles of new drains had been excavated, and water had been provided in several paddocks previously dry. A capacious implement-shed had been erected, and in numerous other ways the general equipment of the farm had been improved. An effort had also

been made to begin strains of the best varieties of grains by hand selection from last season's bulk crops. A table, dealing with the general disposal of the land during the present season revealed that, including the Binnun blocks, there are 104 acres of wheat, 123 of oats, 50 of barley, 40 of rye, 33 of pease and beans, 161 of greenfeed, 14 of sown grasses, six of lucerne, 56 of rape and kale, five of mangolds, 57 of sorghum and maize, 145 bare fallow, 12 of orchards, 15 occupied buildings, yards, &c., and 1,451 acres of grass land.

THE SEASON.

From October, 1911, to September, 1912, the district suffered from a want of good soaking rains. The lack of occasional summer and early autumn showers to start the growth on the fallows was a serious drawback, and the late arrival of the ploughing rains brought about a condition of affairs that led to hasty and at times faulty seeding operations. In September the dry weather was broken by a phenomenal fall of 5·83in. The farm drains were all running to their fullest capacity, and in one field the pressure was sufficient to sweep away a bank. Nevertheless the fall did a wonderful amount of good, both to the crops and to the rooted grasses. It brought in its wake a burst of feed which made it difficult to conceive that only a few weeks before all energies had been directed to carting out chaff and straw to save stock from starvation. Since the September downpour some useful showers have fallen.

THE CROPS.

The general opinion was that Mr. Colebatch and his staff are to be congratulated on the condition of the crops, which give promise of heavy returns. The benefit derived through the excavation of the drains was strikingly shown in one of the fields. The heavy downpour in September caused the head drain in this field to burst its banks at one or two points, and the bad effect on the inundated portion of the crop is still clearly observable.

One paddock of Bordier wheat was anticipated by the visitors to average between 18bush. to 20bush. Referring to this field, Mr. Colebatch states—“The soil is not uniform throughout, but on the whole may be classed as good cropping land for this district. The bank next the farm buildings is of a loamy nature and fairly rich, but the low-lying flat on the northern boundary is a stiff, heavy clay, and inclined to be ‘crab-hole.’ Natural drainage is good, and the lay of the land is such that should it be necessary in wet years to provide supplementary channels the work could be accomplished without difficulty. Past History—In the ‘sheep station’ days this field was used as a horse paddock, and so far as can be ascertained it had been down in grass for at least 10 years prior to 1911. In 1910, pasture; 1911, oats, sorghum; 1912, wheat. The oat crop yielded slightly over 35cwts. of hay per acre, and the sorghum, which occupied about 10 acres on the flat, grew a strong healthy plant. About two-thirds of the stubble

was ploughed up in the first week of May, but as the rains held off the work had to be interrupted, and the eastern side was not completed till May 29th. The heavy harrows were used to form the seed bed, which was drilled with $1\frac{1}{4}$ bush. of graded Bordier wheat and 2cwts. of 36/38 mineral superphosphate per acre between 27th and 31st of May. Germination and early growth were satisfactory, particularly on that portion that carried the summer crop last year. This fact accords with our previous experience on this farm as to the stimulating influence of intertillage on succeeding cereals, even when the summer crop has been a heavy and exhausting one. The plant tillered out well and appeared to suffer very little check from the continuous August frosts. In August Cape weed and other rubbish began to appear on the bank, and an effort was made to keep them down by frequent and heavy harrowing, but without much success. The autumn was too dry to admit of adequate weed-destroying cultivation, and consequently a certain amount of rubbish in the bottom of a late tillering variety was to be expected. The whole field was harrowed and cross-harrowed in August, and a marked improvement in the rate of growth soon became apparent. Bordier wheat ripens about a fortnight later than Federation, and, owing to its extensive root system, it is enabled to withstand summer droughts better than the earlier varieties. Last season it yielded 19bush. 2lbs. per acre, despite the fact that less than 80 points of rain were registered during October, November, and the first week of December."

Some of the oats have thriven splendidly, and one plot was predicted to return about 3 tons of hay to the acre. Mr. Colebatch is fairly confident that this crop will establish a record for the farm. Varieties of wheat being tried are Yandillah King, Lott's, Majestic, Bayah, White Tuscan (northern seed), Dart's Imperial, White Tuscan (southern seed), Huguenot, Federation, Gallant, Clubhead, Talavera, Marshall's No. 3, Baroota Wonder, Golden Drop, Bordier, Treasurer, Tardent's Blue, and Sensation. The following experiments have been planned with great thoroughness, and the results recorded should be of material help to the farmers in these districts. Comprehensive manurial tests are proceeding, and the following varieties of mangolds are being grown:—Champion, Yellow Globe, Red Globe, Giant Half Sugar, Golden Yellow Mammoth, Yellow Intermediate, Long Red, Mammoth Long Red, and Golden Tankard.

FODDERS.

Among the introduced fodder grasses are ordinary Italian and Western wolph's rye grass. The latter is an improved type. Germination was pleasing, but subsequently weeds choked out a good deal. In the struggle for supremacy Westernwolph's proved to be capable of stronger and more vigorous growth in the early stages. At present both plots make a pretty picture, and Westernwolph's appears to rather better advantage than the

ordinary kind. In view of the high price of Westernwolt's seed it is proposed, if the stripper can be suitably adjusted, to gather the seed for future sowings. The fattening qualities of the rye was shown by the splendid condition of a small flock of English Leicesters depasturing in the field.

The conclusions arrived at by Mr. Colebatch, as a result of tests to ascertain the relative merits of different mixtures for early greenfeed, may be summed up as follows:—In the present state of the soils it is not an economical practice to sow tares at the existing price of seed in admixture with cereals for early greenfeed. Rye is without doubt the earliest of all cereals, and it appears to suit the soils of the district. It would seem, however, that the feeding down of rye which it is intended to let stand for grain, is not altogether safe. The second growth tends to come up very spindley, and to develop short, badly filled ears, and shrunken grain. For early spring feed oats appear to be the best cereal to sow at Kybybolite. They stand the cold, wet winter better than barley, and come away quicker in the spring if they have been sown early. Berseem (Egyptian clover) is apparently not suited to the district for autumn sowing, and Mr. Colebatch believes it would have a much better chance in the South-East if sown about the end of July or early in August. Rape and mustard have not shown themselves to be reliable when early sown in dry seasons. Mr. Colebatch considers that the best practice in the district, when winter and spring feeding are the objective, is to sow from 2½ bush. to 3 bush. of a mixture of equal parts of rye and Algerian oats.

DRAINAGE.

Until the last couple of years, which have been exceptionally dry, the great problem at Kybybolite has been to dispose of the surplus water on the land. The extensive system of drains and water furrows has undoubtedly had beneficial effects, but though Mr. Colebatch is confident that he is working on right lines, he is the first to admit that it requires a wet season to put the system to a thorough test. It is particularly interesting to note that whereas formerly it cost 3s. 6d. a chain to make the drains by manual labor, to-day, by the use of a ditching machine, the work can be done rapidly and efficiently at 6d. a chain.

POULTRY STATION AND ORCHARD.

Two features of the farm which attracted a lot of keen interest were the orchard, planted four years ago, and the poultry station. The orchard, which is being conducted on commercial lines, comprises principally apple trees. The growth made has not been particularly rapid, but the trees are fruiting admirably.

Throughout the day Messrs. Colebatch, Quinn, and Laurie were busily engaged in answering questions, and the evident desire on the part of the visitors to gain information on the various operations was the subject of much favorable comment from Dr. Nobbs.

THE SPEECHES.

At the conclusion of afternoon tea the Minister of Agriculture, addressing the visitors, said it was very gratifying to himself, the Director, and Mr. Colebatch to see so many present that day, and to note the keen interest which they had taken in the work being carried out on the farm. The educational influence and value of an inspection by practical farmers of the diversified methods which had been adopted by Mr. Colebatch could never be tabulated, but its worth would be shown in future years by improved practices and successes. When, as they found that day, the best men in the South-East were willing to sacrifice a day from their farms and travel long distances in order to benefit by the exchange of ideas with each other and from what they saw of the work on the farm, it enabled one to look forward with confidence to further progress in the practice of agriculture in South Australia. It was their pleasure to have with them Dr. Nobbs, Director of Agriculture in Southern Rhodesia, and he asked that gentleman to address them. (Applause.)

Dr. Nobbs said that he had come to South Australia, not to make speeches but to learn. Necessarily, this State was, as regarded modern and scientific methods of agriculture, at a more advanced stage than was the country he represented; and, indeed, he had long known that in that respect South Australian farmers were in the front rank in Australia. The reason for that was apparent that day. He had come there to learn and he had found that the agriculturists here were on a similar errand. He considered that large gathering a notable assemblage, as it showed the high value South Australian farmers placed on scientific methods of agriculture. They realised that an experimental station, such as Kybybolite, existed for their benefit, and were prepared to take advantage of all the lessons that might be gained from it. The number which had attended the inspection of the farm and the keen and intelligent interest they had taken in its various operations had been a revelation to him. With that desire to progress prevalent among the farmers South Australia was bound to go ahead. (Applause.) He desired to take the opportunity of expressing his thanks to the Government and the Director of Agriculture for the facilities they had afforded him during his stay in this State.

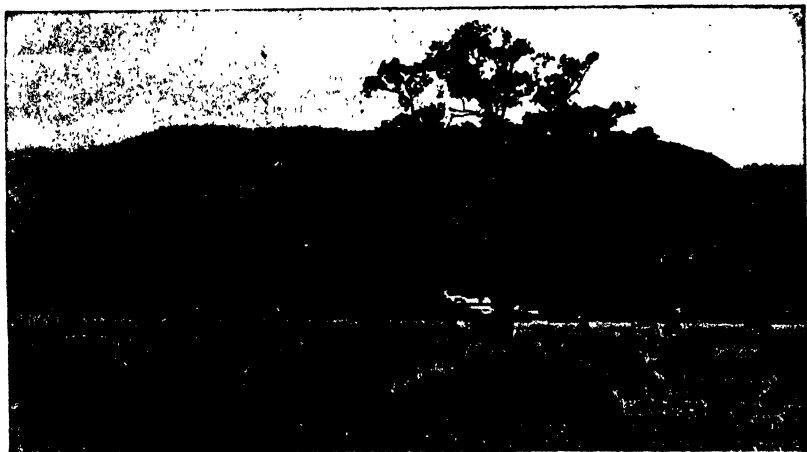
Mr. Wedd (Mount Gambier) proposed a vote of thanks to the Minister, the Director, and Mr. Colebatch for their kindness in having given them the opportunity to inspect the farm and also for entertaining them so well. In connection with the latter their thanks were particularly due to Mrs. Colebatch. Mr. Colebatch had had an up-hill fight to bring the farm up to the condition in which they saw it that day. The land was not first-class, but the crops were equal to any that could be found in the Mount Gambier district. A few months ago when he had been on the farm he wondered how the trouble

caused by the sorrel would be overcome, but the result was a great credit to Mr. Colebatch and all concerned.

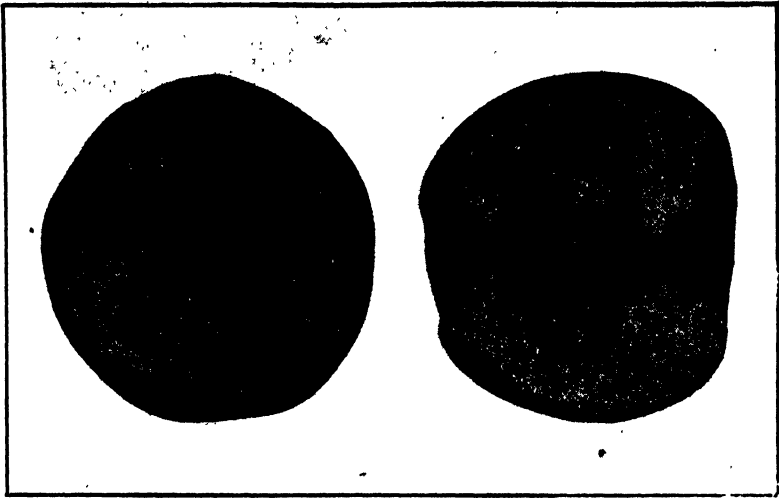
The vote, which was seconded by Mr. Wright (Naracoorte) and supported by Messrs. Stanton (Bordertown), I. Williams (Penola), and Bradley (Kybybolite), was carried by acclamation.

The Director of Agriculture, in responding, said the benefit that accrued to the State from an experimental farm, such as Kybybolite, was not measured by the money return from the land comprising the farm, but it came from the knowledge gained by the farmers generally as a result of the experiments carried out. He congratulated Mr. Colebatch alike on the keen interest taken in his work, on the condition of his crops, and the results of his operations generally.

Mr. Colebatch said he was very glad that so many had attended. With regard to drainage, he believed he was working on right lines. Some had said to him : " Oh, it's all right this year, but you wait till a wet season comes." Well, he also wanted a wet season, so that the work done might be thoroughly tested. He did not say he was out of the wood yet, but he was satisfied he was working on right lines, and only wanted to perfect the system of drainage. Credit for the work they had seen rested with the employes on the farm. He hoped if they came to the farm on some future occasion in a wet season to be able to show them as good crops as they had seen that day. (Applause.)



A HARVEST FIELD.

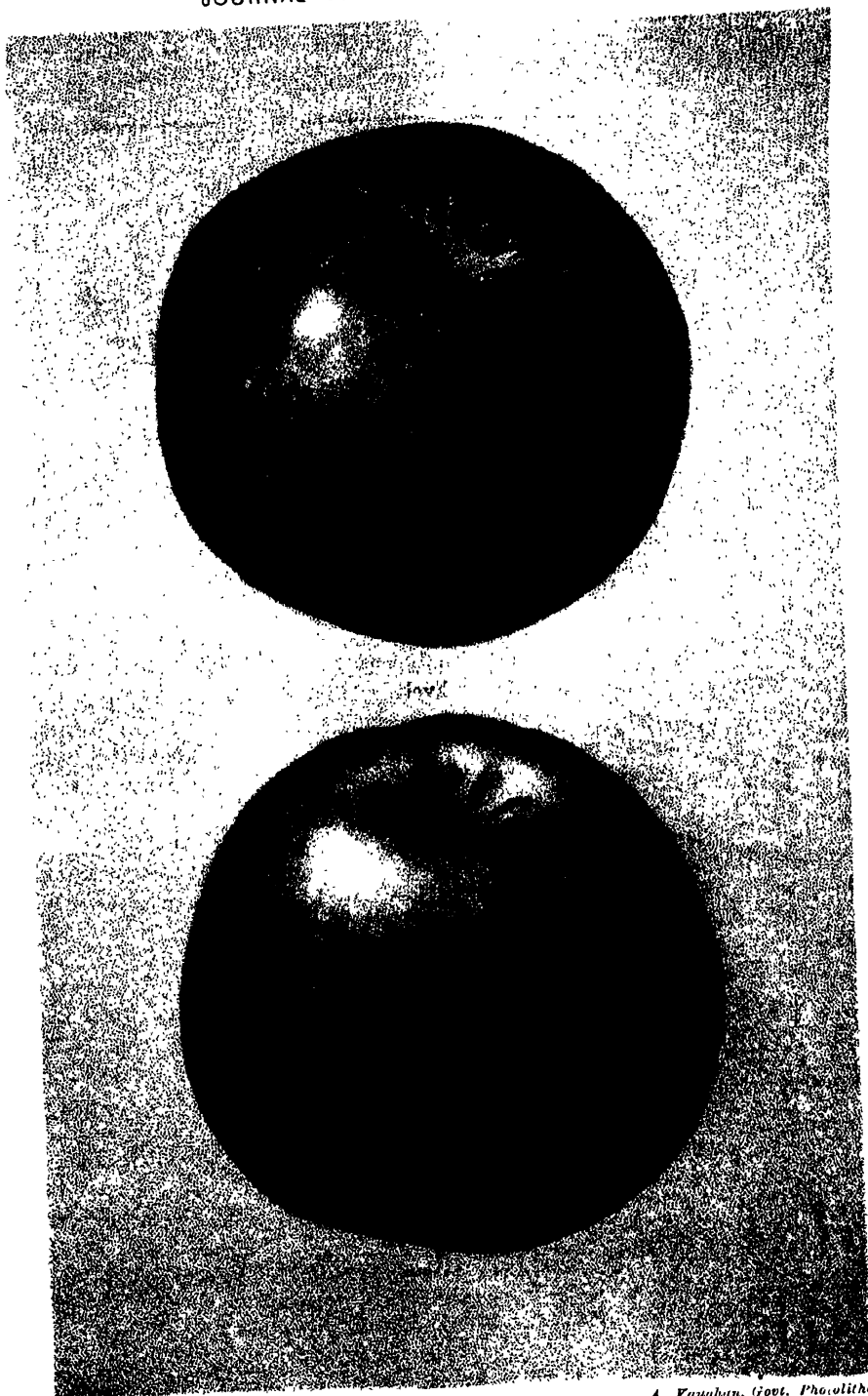


APPLE—ESOPUS SPITZENBURGH.

Size—Medium to large, good specimens measure $3\frac{1}{4}$ in. wide by 3 in. long. *Shape*—Oblong and tapering roundly and evenly to the eye end. *Skin*—Smooth, nearly covered with rich lively red, dotted with distinct fawn russet dots. On the shaded side, or when grown in shade, the skin has a yellowish ground with streaks and broken stripes of red. *Eye*—Small and closed, set in a moderately deep basin with undulating dull yellow-colored sides. *Stamens*—Median, tube conical. *Stalk*—Slender, from $\frac{3}{4}$ in. to 1 in. long, clubbed at end, set in a wide deep cavity which bulges inwards on one side. The skin of this cavity has a dull yellowish tint, which extends in irregular flakes or streaks out over its rim. *Flesh*—Yellow, crisp, firm, with juice of a distinctly delicious flavor. *Seed cells*—Ovate, axile, slit.

TREE.

Habit—Upright when young, producing long, slender laterals, which tend to pull it down after fruiting sets in. The bark of the young green lateral is white and downy, and thickly strewn with fawn dots changing as it matures to a clear greenish-grey tint, with the dots still prominent. The bark on old limbs tends to become reddish-brown. The leaf is large, evenly serrated, elliptical, dark-green in color, and downy beneath, each leaf stalk possessing two leafy stipules at its base. If shaped when young the tree requires very little pruning afterwards. *Liability to disease*—The fruits are very subject to bitter pit, and to fungus diseases to a lesser degree. The tree tends to crop on alternate years. *Climatic and soil conditions*—The variety has not been widely planted in this State, so that little is at present known of its special requirements. It appears to do best in those parts of the Mount Lofty



A. Vaughan, Govt. Photolitho

ESOPUS SPITZENBURG APPLE.

Ranges where the red gum trees are found naturally, such as around Belair and Coromandel Valley, and where the soils are not too strong. Fair specimens have been produced in the South-East. It may, therefore, be classed as a "cool country" variety. Its season locally is from April-July. *Origin*—Esopus, a famous apple district on the Hudson River, U.S.A., formerly settled by the Low Dutch. In America it ranks as a standard apple alongside Newtown Pippin. Its synonyms are Aesopus Spitzenburgh—True Spitzenburgh.

A DESTRUCTIVE ROOT MITE.

Mr. Quinn, Horticultural Instructor, writes:—On page 407 of *Journal of Agriculture*, November, 1912, a paragraph respecting this pest was printed, conveying the opinions of Mr. Lea (Entomologist at the South Australian Museum) respecting its identity and characteristics. This came under the notice of Mr. C. French, jun., Acting Government Entomologist in Victoria, who kindly wrote me to the effect that:—"This mite is very common in Victoria, where it attacks vegetables and garden plants. I would advise you to give the 'manurial insecticide' a trial against it, as we have had splendid results with this chemical in Victoria." In reply to further inquiries, Mr. French forwarded a leaflet respecting this compound, which is obtainable from Morris & Meeks, Ironmongers, Bourke Street, Melbourne, the prices being quoted at the rates of 32s. per hundredweight for 28lbs., down to 15s. per hundredweight for one ton lots. This might be worthy of a trial by those troubled with this "bulb mite" referred to (*Rhizoglyphus echinopus*). The powder is dibbled in about 3in. or 4in. away from the plants and about as deep as the roots are found. It may also be chopped in with a hoe. About $\frac{1}{2}$ oz. is dibbled into each hole.

DEFOLIATED ORANGE TREES.

By GEO. QUINN, Horticultural Instructor.

At the present time many of the orange trees in a large number of the citrus plantations upon the plains of Adelaide present a very dilapidated appearance through the denudation of leaves and the presence of dry brushwood protruding from the tops. As a general principle this applies to the trees of mature age, and to a lesser degree to those planted only a couple of seasons ago. Those trees rising from three years to seven years old are, as a rule, in much better condition than those older or younger. This decadent appearance in the commercial citrus groves is so general along the valley of the Torrens that I have been frequently consulted of late by growers respecting its possible cause and how to mitigate the injury sustained. After examining a great number of trees growing in many orangeries I am of the opinion that it is due to a combination of circumstances which, fortunately, do not often arise. These are as follows:--The winter of 1911, when the orange trees matured a very heavy crop, was one of very deficient rainfall, only 15.99in. falling for the whole year. For the first half of 1912, 7.64in. fell, the season proving cool but dry late into the autumn. The effect of this upon the trees was productive of a slowly-ripened growth of a somewhat stunted character. Early in the spring the trees started into growth and produced a profusion of bloom scarcely equalled within my recollection. Simultaneously with this start to bloom the old foliage began to fall freely, and by the time the white sheet of blossom had gone from the trees they presented a broom-like top of dead or drying twigs. At the present the twigs which have survived are crowded with embryo oranges, many of which are falling, or must fall, infertile.

I am strongly of the opinion this condition has resulted from lack of moisture in the soil during the summer of 1911 and autumn of this year. During that dry period the useful reserve of moisture usually present in the subsoil became exhausted, and the very partial wetting of the soil by irrigation applied under ordinary methods did not make up for the deficiency.

Anyone who has had occasion to carefully break up an irrigation trench or ring shortly after a tree has received what has been considered a good drink, must have been surprised to note what a short distance the moisture had spread through the soil, either in a lateral or downward direction.

Now, the sublayers of soil in a plantation occupied by fully-grown citrus trees are known to be permeated by a complete network of roots. Further,

the outer fringe of these is usually composed of the most recently formed and active fibres. When trees are watered individually by the ring or basin methods a great portion of these outer extensions of the root system would be spread beyond the soakage radius of the irrigation water, and must in



Orange Tree in need of Renovation.

consequence suffer most. Knowing that there is a sympathetic extension going on in the branch and root systems of a tree, it would appear reasonable to assume that the above explanation of the decline of the roots can account for the dying back of the terminals of the branches. This can be proved to

demonstration with any plant grown in a pot, from which it may be removed and the condition of the roots closely ascertained. The gardener who finds his hard-wooded potplants going off at the extremities of the branches almost invariably realises that the terminal absorbing rootlets have decayed, whether

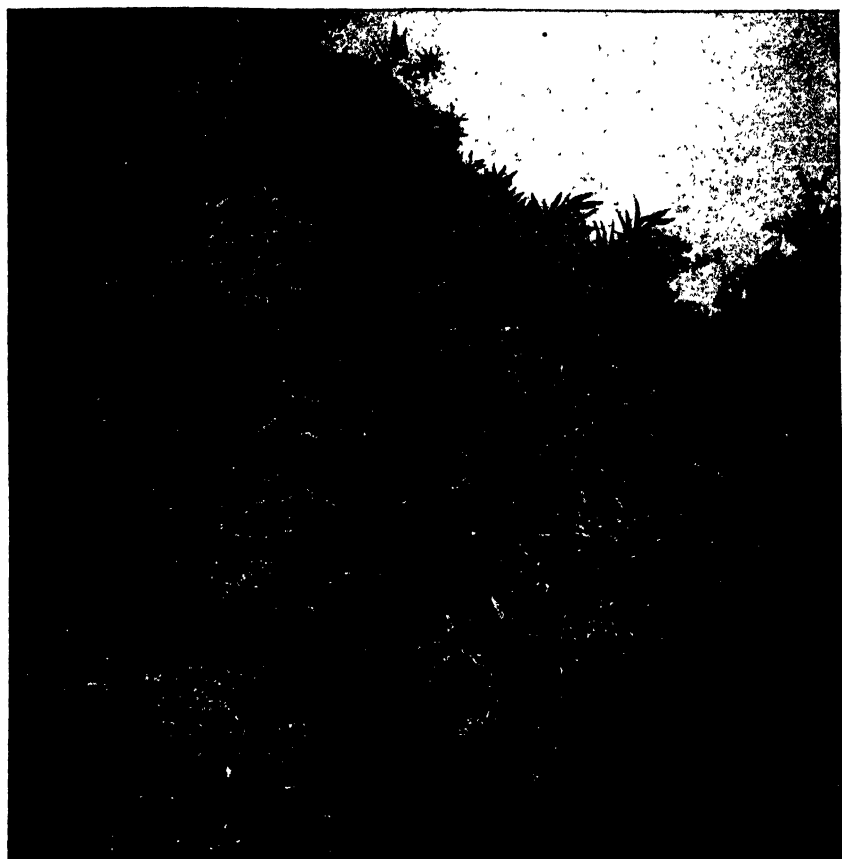


Pruning Suggested for Renovation of Previous Tree.

it be through lack of water or too much moisture due to interrupted drainage. The method of resuscitation usually adopted in such cases is to remove the plant from the pot, scrape or wash away the stagnant or dried soil, carefully prune away the dead ends of the roots, cut back the top in proportion

to where the wood and bark are healthy, and then replace the plant in probably a smaller and cleaner well-drained pot, embedding its roots in sweet, new soil of only a moderately rich consistency. After it has made a good start to form fresh roots and shoots it may be repotted or topdressed with richer soil, or receive doses of liquid manure from time to time.

This procedure indicates to my mind a way to renovate our citrus trees. If the bark on the branches be carefully examined, it will be noted that



How the Tree in the Previous Plate appeared a few months later

many erstwhile dormant buds are starting into activity below the position of the dead twigs. These usually hint at where to amputate the declining twigs or branches. Sometimes lively shoots are emerging from limbs a closer examination of which shows dead bark on one side below such young growths. In such cases cut below these first shoots to where the bark is sound all around the branch. If no bursting buds are showing upon the branches, test the bark with the knife for an indication of free, healthy sap beneath, and cut where that is found.

Following up this treatment of the top, the roots must receive encouragement. Unlike the potplant, it is not usually practicable to cut away the dead roots, but the formation of new roots from the sound portions of the old ones may be readily achieved by generously treating the soils above them. This consists of good tillage and frequent irrigating, and— if no organic mulching material be available—breaking up and finely pulverising the soil where the water trenches were made, between each irrigation.

Wherever the trees are showing for young growth and carrying a crop of newly-formed fruit, a little nourishment in the shape of a readily-soluble fertiliser should be given in several small doses over the summer season. A nitrogenous compound is necessary to assist the formation of foliage and shoots, and to this could be added phosphatic and potassic fertilisers wherever a crop is on the tree. From 1lb. to 1½lbs. of nitrate of soda or sulphate of ammonia, 1lb. of sulphate of potash, and 3lbs. superphosphate would form a good ration per tree. If the soil be sweet and possessed of lime, the three last-named could be mixed together and applied so. The method suggested is to divide the combined dressing into three parts and apply one-third at each irrigation. The mixture could be sown into the irrigation rings around each tree as they were filled, beginning, of course, at the lowest point of the flow as each ring is finally shut off from the water head. The ammonia and potash would dissolve at once and soak in with the percolating water, whilst what remains of the superphosphate, though less rapid in dissolving, could be mixed into the soil when pulverising the rings a day or two later. Such a process has been found to feed the trees and help them to carry their crops without exhaustion. Should the summer prove dry, it would be a wise precaution to enlarge the area of the irrigation rings around each tree at each *alternate* watering, as this would tend to obviate to a great extent the formation of those dry zones to which this decline has been mainly attributed.

It may be mentioned, in passing, that in 1897 a precisely similar decline occurred in our citrus trees. In 1896 the rainfall was 15·17in., and in 1897 the ground was not soaked until June, and the year's fall only totalled 15·42in. On page 420 of this *Journal* for December of that year I gave a description of the condition of the trees then which might be read with interest by anyone who perhaps views the present situation with apprehension.

The plates given herein were taken at that time, and are typical of the process of renovation suggested herein.

FARM ANIMALS.

HEREDITARY UNSOUNDNESS—(*Continued*).

By C. A. LOXTON, G.M.V.C., Assistant Government Veterinary Surgeon.

BOG-SPAVIN AND THOROUGHPIN.

Both these diseases affect the synovial (lubricating) structures of the hock. The hock joint, in common with other true joints, is provided with a capsular ligament lined by a membrane which secretes synovia or "joint oil." Where the tendons of muscles pass over a joint they are bound down by fibrous sheaths and lubricated by the same fluid.

When this synovial fluid, or "joint oil," is secreted in an abnormal and excessive amount, it distends the capsule and forms an elastic fluctuating swelling at a point where there is least resistance to the pressure.

This condition affecting the true hock joint constitutes bog-spavin, and when affecting the bursa of one of the great tendons passing over the hock is called thoroughpin.

Both these diseases are often associated and are most common in draught horses, especially in young animals just put to work, and in those being prepared for show. Hereditary predisposition is a very important factor, as is also defective conformation of the hock, which is itself an hereditary defect. In this connection straight hocks are especially to be noted.

Bog-spavin, as already described, is a distension of the capsule of the true hock joint with synovia. It takes the form of a fluctuating, more or less soft, swelling, chiefly in front and towards the inside of the joint. The extent of the swelling is variable, as is also the degree of lameness caused by the trouble. In most cases the lameness is not pronounced, amounting to slight stiffness at the joint; in others there is acute inflammation, accompanied by severe lameness.

Thoroughpin is a synovial swelling, similar in character to bog-spavin, and situated at the upper and posterior point of the hock. The swelling is ovoid in form and may appear on one side only, but more frequently on both. Pressure on one side increases the size of the swelling on the other side, which gives the name thoroughpin to the disease.

CURB.

This unsoundness forms an enlargement at the back of the hock, a few inches below the point. The swelling is best seen by viewing the leg in profile, when the normal straight line from the point of the hock to the fetlock will be seen to have a convexity at the seat of curb—about 3in. or 4in. below the point of the hock.

Curb is most common in light horses, and consists in an inflammatory thickening of an important ligament attached to the posterior surface of the bones of the hock and to the head of the cannon bone behind. Horses with "tied in" and those with sickle-shaped or curby hocks are particularly prone to the disease.

True curb must be distinguished from that defect of conformation known as "curby" hocks, which, however, are predisposed to curb. Heredity is also a predisposing cause.

In the early stages of the disease lameness is present, with local heat and pain on pressure. As a rule lameness disappears in a week or two, except in young horses, but the swelling remains as a permanent blemish.



POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

CO-OPERATION AMONG POULTRY BREEDERS.

As a rule poultry breeders, especially those who live in the country, complain that they are compelled to accept whatever prices the collectors and storekeepers choose to pay. They also know that even where there is competition they (the breeders) pay the middleman his profit. In some localities, and under certain conditions, the collectors and hawkers are valuable aids in collecting and marketing produce. There are many localities, however, where breeders are numerous, and where good market facilities exist. It would be to the advantage of breeders to co-operate for their mutual benefit. Many breeders keep only a few fowls, and even in the glut season do not gather sufficient eggs to fill a case. Here co-operation would be a boon, for the following reasons :—

1. Eggs should be gathered daily, and sent to market twice a week in cold weather and three times a week in hot weather.

2. The smallest egg crate which it is profitable to use contains 25 dozen eggs. Only a large breeder could use such large cases for forwarding eggs to Adelaide.

3. In order to obtain the best results, and to minimise breakage, it is advisable to use modern egg crates. These contain, when full, 25 dozen, and are strongly made, fitted with cardboard fillers, boards and wood wool packing material. They are accepted on the railways as weighing, when full, half a hundredweight. The lid is reversible, and can be branded with the owner's name and address on one side, the name of the Adelaide merchant on the reverse. The lid is fixed so that it can be attached or removed quickly ; no nails are required.

4. If the eggs could be delivered at a given point, where they would be received and packed by some person appointed, then uniformity can be attained and sufficient eggs obtained to fill one or more cases without delay.

5. Merchants are beginning to pay more attention to quality, and the absolutely fresh egg is gaining recognition as the only one which should be sold and bought at full rates. Unfortunately the day has not yet come when the sale of stale eggs is prohibited. Still, it is satisfactory to learn that stale eggs, in many cases, are now sold as such. Co-operation, that is the bulking and prompt marketing of the poultry products of a number of breeders, will bring about improvement in this direction.

NARACOOORTE POULTRY ASSOCIATION.

The poultry breeders of Naracoorte some time ago decided to form a local poultry association. When I was first communicated with upon the subject I was under the impression that an ordinary association for exhibiting show poultry was intended. It was gratifying to learn, however, that something of more value to the industry was contemplated. An association, on co-operative lines, was formed, and up to the present the members are well satisfied with results, and are working to gain further benefits.

The following are the principal rules adopted by the Naracoorte association, and it is to be hoped that they will be adopted by associations to be formed in other localities :—

1. The association shall be called "The Naracoorte Poultry Association."
2. The objects of the association are, viz.—(a) To facilitate the marketing of eggs. (b) To encourage poultry breeders to pursue a more thorough method of egg-production. (c) To improve the industry in every branch.
3. The officers of the association shall consist of president, vice-president, committee comprised of four (4) members, secretary and treasurer (to be a member of the association).
4. The affairs of the association shall be managed by a committee consisting of the president and four (4) committeemen, to be elected at the annual meeting. Three (3) members to form a quorum.
5. The subscription to the association shall be two shillings and sixpence (2s. 6d.) per annum.
6. The duties of the secretary shall be—(a) To receive all eggs, pack and dispatch them to the market. (b) To attend to all clerical work in connection with the association.
7. The secretary shall receive as salary from the association one half-penny per dozen on all eggs marketed.
8. (a) All eggs delivered by the members must reach the secretary clean and graded. (b) All eggs excepting the undersized ones must be stamped. (c) From the first day of November until the last day of April, all eggs must be infertile. (d) Members shall accept the prices obtained for eggs, less the deductions made for marketing expenses.
9. The president or the secretary shall at any time visit the poultry yards of any members, for the purpose of seeing that rule No. 8 (c) is being strictly observed.
10. All egg cases shall become the property of the association.
11. Any member resigning or being dismissed from the association shall forfeit his or her entrance fee.
12. All fractions in connection with the sale of each consignment shall be devoted to the funds of the association, and if a surplus exists at the end of the year, a bonus shall be declared to members.
13. The association shall purchase stamps, and will deliver same to members at cost price.

14. No non-member shall be allowed to forward eggs through this association.

A GOOD EXAMPLE.

On visiting various parts of the country I find many cases where half a dozen farmers live sufficiently close to one another to justify the formation of a similar association. Not only are eggs dealt with, but also live poultry. Poultry of all sorts has, during the last few years, realised excellent prices in Adelaide. In most country districts the local prices are low, and out of all proportion to the Adelaide equivalent. I met many farmers who would have been glad of the extra penny or penny halfpenny per dozen that eggs dealt with on the co-operative plan would have realised. There is evidence in every direction that farmers and others are attracted by the greatly improved prices eggs and poultry are now realising. The uncertainties of seasons were for a time overlooked, but recent events have accentuated the value of poultry, and many have resolved to breed on a fairly liberal scale, so that, at any rate, there shall be some revenue from the farm. Without rain you cannot grow crops, but as long as you have water for your fowls to drink they will thrive under any degree of drought. This is well known to most of the older generation of farmers.

MORE INFORMATION.

Energetic readers are informed that the Poultry Expert will be very pleased to give any information required, and will do his utmost to assist in the formation of any projected associations. It may be pointed out that these associations are in no way State institutions. The end in view is the better and more profitable marketing of produce. The preliminary expenses are small, and include a stamp for each member and the requisite number of egg crates. Mr. W. G. Haynes, of Naracoorte, the secretary of the local association, will, I am sure, reply to any letters if a stamp for reply is enclosed. I recently received an invitation to lecture before the Naracoorte Association, and was delighted with the keen audience, who evinced every desire to keep abreast of the times as regards breeding and marketing methods. If invited, I shall be pleased to address other associations, either with a view to assisting in their formation, or of suggesting improved methods of breeding, feeding, &c., as applied to poultry.

OPERATIONS FOR DECEMBER.

The unusually cool weather experienced in November has been favorable to the growth of strong chickens, &c. The frequent cold snaps and periods of wet, rough weather, however, have in some localities caused great mortality among the chickens, especially the late hatched ones. The experience of a number of breeders this year has strengthened a long held conviction that very early hatching is desirable. Autumn-hatched chickens have done well. The cockerels have realised excellent prices as table birds, and on all hands we see fine flocks of autumn-hatched pullets in full lay.

On some large poultry plants the method adopted is to hatch all the stock at a given date. I hear of one Victorian establishment where only one hatch was arranged for. Sufficient incubators to provide for a hatch of 2,000 chickens in one batch were filled. This method could not be generally adopted, and I am not sure that it is advisable except in special circumstances.

THE BREEDING STOCK.

As a rule, on the termination of the breeding season, the valuable breeding stock is neglected. No greater mistake could be made. Any that are to be discarded should be culled out and disposed of. Progressive breeders must make room for improved stock and thus annually have old stock, but valuable for their breeding, which can be disposed of at moderate prices. Beginners are, as a rule, glad to get such birds, for, although they will not lay as many eggs as younger birds, are of good breeding, and preferable as breeders to pullets and other immature birds.

The breeding hens to be used again next season should be looked over and examined as to condition. Vermin should be destroyed, and scaly leg treated with soft soap. The male birds should be removed and penned as far away from the hens as possible. They should also be carefully examined and treated as necessary. Male birds to be used in the breeding pens next season should be got into good condition, otherwise the progeny will be poor.

MOULTING.

Towards the end of the month the annual moult may begin in some localities. More generous feeding will generally assist the process. Linseed boiled to a jelly and mixed in moderation with the morning mash will prove valuable. Its use will, as a rule, affect egg production, but it will also act upon the feathers. The additional fat content will act on the old feathers in the direction of assisting the process of casting. The special proteins will assist the formation of the new feathers.

Sweep up all cast feathers and burn them. They are unsightly and may cause feather eating. Chickens often contract a bad habit of eating the cast off feathers which lie about the runs. The consequence is that impaction of the crop is frequent.

As the breeding hens come through their moult they should be penned ready for autumn breeding. If a few pens can be put together in March or April there will be some fine early chickens. Various statements have been made against autumn hatching; as a rule by persons who have not had practical experience. Quite a number of large breeders are following the advice previously given on this point, and already they have proved its great value. At the poultry stations the autumn-hatched pullets have been invaluable as layers and for use as breeding stock later on. They have a long period of growth in cool weather.

THE YOUNG STOCK.

Push forward the surplus cockerels and dispose of them as soon as large and fat enough for sale. Those intended as breeders, whether for sale or otherwise, should not be forced, but should be kept growing and free from vermin. The pullets must be well attended to also. Keep them growing, and do all you can by frequently shifting them from yard to yard to delay egg production until they are well grown. Do not use meat or green bone; these force them to early laying. The result is that the immature pullet is stunted and that she lays small eggs.

INTERNAL PARASITES (WORMS).

There are several species of internal parasites which affect poultry. The round worm is very frequently found. The most common is that known as *heterakis*, of which there are several. Some inhabit the crop and gizzard, others the duodenum, caeca, &c., in the bowels. They vary in length according to species, from one-eighth of an inch to over 3in. in length, are very slender, and generally whitish in color. Chickens, especially those late hatched, become infected. Often the symptoms are looseness of the bowels and a choking sound and running at the nostrils which may be mistaken for roup. The birds become emaciated and have a ravenous appetite. Sometimes the worms may be passed in the excreta.

Treatment.—Fast the birds for 12 hours, allowing water to drink, but no food of any sort. Mix with dry bran and pollard a heaped teaspoonful of the following powder for each 20 adult, or 30 half-grown, or 40 quarter-grown chickens. When thoroughly mixed the bran and pollard, &c., may be moistened to a crumbly mass. Repeat in a fortnight:—

Santonine	1 part	} By weight.
Freshly ground areca nut	7 "	

For a single fowl, give in a bread pill, 7grs., or as much as will lie on a sixpence. The ground in the yards should be well disinfected and then worked over.

HANDLING A SICK BIRD.

It is occasionally necessary to examine a bird or to administer medicine. Place the bird under your left arm so that its weight rests on your lower arm and wrist. The upper part of the arm encircles the wings and legs and prevents flapping and kicking. The left hand is available to hold the head or to open the mandibles (beak). Your right hand is free now for performing an operation, or for administering medicine, whether liquid or as a pill. Pills should be dropped behind the tongue, the beak closed, and the pill then stroked down the gullet.

AUSTRALIAN STOCK IN AMERICA.

It is gratifying to note that in Section 1 of the Laying Competition held at Victoria, British Columbia, the first and second prizes were gained by an Australian bred pen.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended Nov. 30th.	Total Eggs Laid from April 1st, 1912, to Nov. 30th, 1912.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Cowan Bros., Burwood, N.S.W.	123	948
Tabuteau, J. O., Black Rock, Melbourne	121	774
Hodges, H., Pyalong, Victoria	148	826
The Range Poultry Farm, Toowoomba, Queensland	125	840
Brundett, S., Moonee Ponds, Victoria	143	866
Jessup, W. C., Caulfield, Victoria	119	777
Dawes, J. H., Granville, Sydney	133	920
Beadnall Bros., Gawler	122	923
Redfern Poultry Farm, Caulfield, Victoria	150	742
Kerr, R., Longwood, S.A.	128	933
Eckermann, W. P., Eudunda	137	861
McNab, J. A., Sandringham, Victoria	120	758
Mazey, P., Alberton	91	633
Broderick, P. J., Gawler	111	704
Redfern Poultry Farm, Caulfield, Victoria	129	738
Braund, J. E. and H. J., Islington	137	715
Dunn, L. F., Keswick	127	756
Hocking, E. D., Kadina	145	763
Groom, E., Peterhead	133	723
Pope, R. W., Heidelberg, Victoria	125	897
Haimes, T. F., Fullarton Estate	128	684
Provis, W., Eudunda	140	774
Burton, W. S., Moonta Mines	140	763
Broster, G., Mallala	148	797
Brain, J. H., South Yan Yean, Victoria	133	786
Sargenfri Poultry Yards, East Payneham	147	931
McKenzie, H., Northcote, Victoria	143	881
McDonnell, J., Greytown, Rosewater	97	816
Browne, A. R., Hawke's Bay, N.Z.	146	897
Brain, J. H., South Yan Yean, Victoria	122	694
Marson, C., Welland	109	597
Hutton, C., Parkside	87	709
Miels, C. & H., Littlehampton	127	686
Moritz Bros., Kalangadoo	127	822
Codling, H., Mitcham Park	121	645
Troughbridge Poultry Yards, Edithburg. Y.P.	118	706
Irvine, A. W., Epsom, Auckland, N.Z.	118	727
Walker, P., Hicksborough, Victoria	130	736
Lampe, B., Kadina	118	549
Waite, F. J. O., Nailsworth	128	855

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Nov. 30th.	Total Eggs Laid from April 1st, 1912, to Nov. 30th, 1912.
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SECTION I.—LIGHT BREEDS—*Continued.*WHITE LEGHORNS—*Continued.*

Badcock, G., Mile End	132	684
McClelland, A., Mordialloc, Victoria	112	612
Tomlinson, W., Clarence Park	127	747
Roberts, L. L., Kadina	145	760
"Stratheona," Long Plain	135	788
Whitegate Poultry Farm, Deepdene, Victoria	128	738
Purvis, Miss Gracie, Glanville	133	797
Padman, A. H., Hyde Park	123	819
Sickert, P., Clarence Park	133	810
Purvis, W., Glanville	133	803
Rice, J. E., Cottonville	131	895
Hamill, H., Kogarah Bay, Sydney	139	728
Gurr, W. E., Kapunda	123	725
McLeish, E., North Adelaide	139	739
Craig Bros., Hackney	131	763
Uren, Mrs. P. A., Kapunda	117	1,039
Perry, Wm., Murrumbena, Victoria	136	691
Nancarrow, J. T., Port Adelaide	80	690
Bertelsmeier, C. B., Clare	125	805
Tockington Park Poultry Farm, Grange	117	823
Trenwith, T. H., Kadina	130	656
Knappstein & Bray, Clare	138	658
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	130	737
"Denehollow," Caulfield, Victoria	121	699
Hill, Chas., Monarto South	85	604
"Islay," East Malvern, Victoria	133	697
Cosh, A. J., Burnside	132	813
Indra Poultry Farm, Freeling	119	705
Whitrow, A. J., Knoxville	124	773
Hall, T. C., Rose Park	80	750
Ontario Poultry Farm, Clarendon	138	758
Howlett, H., Moonta	127	716
"Koonoowarra," Enfield	99	801
Hall, A. W., South Oakleigh, Victoria	151	880
Convent of the Good Shepherd, Oakleigh, Victoria	135	667
Carne, E. A., Kangaroo Flat, Victoria	134	776
Navan Poultry Farm, Minlaton	128	631
Lillywhite, R. G., Fullarton	136	797
Gibbs & Pine, Queenstown	139	536
Hughes, J. J., Elsternwick, Victoria	126	640
Shamrock Poultry Farm, Perth, W.A.	106	654
Bertelsmeier, C. B., Clare	131	731
Nancarrow, J. T., Port Adelaide	133	769

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Robertson, F. H., Northam, W.A.	80	531
McKenzie, E., Northcote, Victoria	99	526
Mitchell, B., Bendigo, Victoria	81	518
Provis, W., Eudunda	103	609
Kenway, D., West Pennant Hills, Sydney	87	701
Cowan Bros., Burwood, N.S.W.	117	733
Kenmore Poultry Farm, Dandenong, Victoria	94	430
Brundett, S., Moonee Ponds, Victoria	113	633
Cant, E. V., Richmond	103	634

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Nov. 30th.	Total Eggs Laid from April 1st, 1912, to Nov. 30th, 1912.
SECTION II.—HEAVY BREEDS—<i>Continued.</i>		
BLACK ORPINGTONS—<i>Continued.</i>		
Craig, Mrs. C., Hackney	96	600
Lampe, B., Kadina	83	671
Wirraparinga Poultry Yards, Plympton	89	642
Phillips, A., Portland, S.A.	101	566
Martin, B. P., Unley Park	114	747
Nancarrow, J. T., Port Adelaide	62	355
Padman, J. E., Plympton	102	683
Francois Bros., Fullarton	73	512
Hall, T. C., Rose Park	92	679
Tockington Park Poultry Farm, Grange	105	569
Bertelsmeier C. B., Clare	90	616
Craig Bros., Hackney	106	707
Bertelsmeier, C. B., Clare	111	697
SILVER WYANDOTTES.		
Dunn, L. F., Keswick	114	741
Tidawell, H. J., Mitcham Park	67	603
Moyses, S., Blyth	75	561
Perry, Wm., Murrumbena, Victoria	93	549
"Denehollow," Caulfield, Victoria	95	613
Western, F. C., Marion	83	707
SALMON FAVEROLLES.		
Courtenay, K., Mordialloc, Victoria	105	662
LANGSHANS.		
Stevens, E. F., Littlehampton	124	718
PLYMOUTH ROCKS.		
"Koonoowarra," Enfield	120	697
SECTION III.—SCRATCHING SHED SECTION.		
WHITE LEGHORNS.		
Sickert, P., Clarence Park	137	847
Tomlinson, W., Clarence Park	129	911
Moritz Bros., Kalangadoo	129	717
Codling, H., Mitcham Park	126	660
Sargenfri Poultry Yards, East Payneham	144	724
Purvis, W., Glanville	125	720
Bertelsmeier, C. B., Clare	125	803
Padman, A. H., Hyde Park	143	882
Hocking, E. D., Kadina	140	723
Beadnall Bros., Gawler	133	686
Brain, J. H., South Yan Yean, Victoria	107	552
Provis, W., Eudunda	147	791
Redfern Poultry Farm, Caulfield, Victoria	138	816
Broderick, P. J., Gawler	126	691
"Koonoowarra," Enfield	114	645
Lillywhite, R. G., Fullarton	133	729
Cosh, A. J., Burnside	114	667
Indra Poultry Farm, Freeling	133	722
Whitrow, A. J., Knoxville	133	727
Tockington Park Poultry Farm, Grange	141	766

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended Nov. 30th, 1912.	Total Eggs Laid from April 1st, 1912. to Nov. 30th, 1912.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	111	900
Dow, A., Glencoe West	110	834
McNamara, Mrs., Mount Gambier	110	735
Moritz Bros., Kalangadoo	144	1,027
"Mahama," Mount Gambier	122	816
Holmes, F. A., Frances	133	878
Sudholz, A., Kalangadoo	107	709
Staunton, S., Naracoorte	119	670
Hall, C. W., Mount Gambier	99	810
Moritz Bros., Kalangadoo	116	907
Vorwerk, K. E., Millicent	127	840
Vorwerk, H. F. & A. C., Millicent	118	833
Jarrad, J., Mount Gambier	128	805
Bartram, T. A., Kybybolite	98	887
Vorwerk, H. F. & A. C., Millicent	96	659
Jenkins, R. D., Kybybolite	109	657
Arthur, J. S., Bordertown	98	731
Drake, C., Naracoorte	126	782
"Eurinima," Kybybolite	117	856
Smith, M., Hynam	135	740
Lacey, F. C., Kybybolite	127	1,020
"Herdfield," Mount Gambier	146	965
Blue Lake Poultry Farm, Mount Gambier	104	723
Beaton, W. J., Tantanoola	133	807
Bennett, E., Kalangadoo	120	659
Jones, H. F., Mount Gambier	125	700

MINORCAS.

James, S. T., Mount Gambier	129	542
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdfield," Mount Gambier	127	764
Blue Lake Poultry Farm, Mount Gambier	31	476
McNamara, Mrs., Mount Gambier	110	409

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	89	606
Osborne, W. F., Kalangadoo	99	689

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	107	458
Glenelg River Poultry Farm, Mount Gambier	102	494

NOTES ON EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

REPORT FOR MONTH OF NOVEMBER, 1912.

At this season of the year many things may happen, any of which may make or mar the prospects of record figures. Last year (1911-12) the leading pen, at this time and until the end of the test, was putting up splendid records for the season of the year. This year the leading pen for some time had a substantial lead upon the figures of the winning pen last year, but although the egg yield is good it does not compare with the yield of the winning pen at this period last year. It is yet too early to prophesy. Last year the man in the street forecasted incorrectly. Much depends on when the birds moult and how they come through that process. Sudden changes or very severe heat may wreck the chances of a pen, or even of the whole competition, for good averages. Health—It has been again noted this year that an undue number of the hens have died of trouble connected with the organs of reproduction. This matter was the subject of comment by me in the report of the last competition. My views were not palatable to some people who, apparently, would disguise facts. It is my duty as Poultry Expert, and for the time custodian of the birds in the public tests, to comment on all such features and to issue timely warnings. I have pointed out that certain pens have had more than one case, and that this points to hereditary weakness in the stock. At no time did I infer that this and similar troubles were common among our flocks of poultry. Breeders must desist from measures which tend to force egg production or growth. Many of these troubles are the result of the silly advice given by impractical poultry writers who advise the free and liberal use of cut green bone, and other animal food, all of highly forcing nature. Stock which produces progeny with similar failings is manifestly unsuited, and a change should be made.

ROSEWORTHY.

The Superintendent reports—The present time ends the eighth month of the test and is a period when fluctuations in the laying, alteration in the appearance of the birds, and various other changes may be expected. In fact, it is a time which might be termed critical, as any unseasonable weather or very sudden changes in climatic conditions may result unfavorably to the birds. Some of the birds are at the stage when radical changes in the weather may start an early moult. It will be remembered that nearly all of the birds moulted more or less severely after their arrival here this year, and, therefore, according to the laws of breeding ought not to moult a second time in the period under test, but past experience has shown that it is quite possible to experience a general break up among the layers. This, if not characterised by a heavy general moult, is sufficiently severe to affect the averages, and in many instances to stop the laying altogether. The advent of drier weather conditions with higher temperatures appears to be against further heavy general laying, as totals have shown a tendency to diminish lately. And although, perhaps, not to any great extent, indications point to a lowering in that direction in the future. During the month strong winds have been prevalent, and such conditions do not in any way tend to increase the productiveness of the hens. The average maximum temperature has been 74°, the average minimum 45·4°, with 98·7° and 31° as the highest and lowest readings. Rain fell on eight days, aggregating 1·84in. The general health of the birds is good. I regret having to report six deaths during the month, as follows:—Section 1—Four, apparently from the following causes:—One through liver complaint, one severe attack of dysentery, one through cropbound, one paralysis. Section 3 lost two through oviduct troubles. All the birds but one have been replaced. Broodiness has prevailed as follows:—Section 1, 64; section 4, 105; section 3, eight; total, 177. The production by the three sections for the month was as follows:—Section 1, 10,510; section 2, 2,957; section 3, 2,617; total, 16,084 eggs. The averages per pen were 126·6, 95·3, and 130·8 respectively, while the grand total shows a falling off of 382 eggs as against that of October.

Inter-State Competitors.—The inter-State competitors are holding their own, and have put up fair records. It will be noted their scores for the month of November are of the highest. All the birds are well and in good working condition.

KYBYBOLITE.

The Superintendent reports—The laying for the month was similar to that of last month, making neither improvement nor an appreciable falling off. For the first six months the birds were confined to their houses, which measure 8ft. by 4ft. 6in., and during October and November were allowed the runs attached, which are 30ft. long. No improvement in the scores can be noticed, in fact the best scores were put up during the period of confinement. The feeding has been the same, and the only reason that can be assigned for the lack of improvement in the laying and slight falling off is the changeable weather that we have had. It has been very warm on one day and cold and wintry the next. Possibly the fowls would have laid better if they had been kept in their houses until now, but, when once they are let out, I do not think it advisable to shut them in for a day or so for rough weather, as they do not take kindly to too many changes. The wind has been severe during the month. The maximum temperature was 90° and the minimum 36°. On 20 days wind was registered. Two deaths occurred in section 1 and were due to oviduct troubles; otherwise the birds are all well and healthy in appearance. In section 1 four birds had to be removed for broodiness, while section 2 added 14 to the broody pens.

D. F. LAURIE, Poultry Expert.

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Department reports on December 1st :—

BUTTER FACTORY.

The supply of cream received this month has been greatly in excess of the usual quantity for this period of the year, and the generally cool conditions have kept it up to a high standard, so that the quality of the butter has been well maintained.

There has been a slight reduction in prices during the month, present quotations being superfine, 11½d. per lb.; and pure creamery, 10½d. per lb.

A. W. Sandford & Co., Limited, report on December 1st :—

BUTTER.—The splendid general rainfall experienced early in November has had the effect of lengthening the season in butter and cream, though supplies are now on the decrease. The London market weakened considerably and consequently values here receded in sympathy. Best factory and creamery, fresh in prints, sold at from 10½d. to 11½d. per lb.; choice separators and dairies, 10d. to 11d.; store and collectors, 8½d. to 9d.

EGGS.—The market continues firm. Buyers are still operating extensively, values now being 10½d. per dozen for guaranteed new-laid hen; duck, 10½d.

CHEESE.—Prices are not quite so high as a month ago for new made, but matured samples are still very scarce. New made is selling at 6½d. to 7½d. per lb. for large to loaf; matured, 11d. to 1s.

BACON AND HAMS.—The rates ruling here previously have, as mentioned earlier, attracted consignments from other States, and consequently values are weaker. Best factory-cured sides realised 9½d. to 10½d. per lb.; hams, 1s. to 1s. 1d.

HONEY.—The demand continues brisk, all consignments of well-flavored clear extracted meeting with speedy sales at 3½d. per lb.; beeswax, 1s. 3d.

ALMONDS.—The season being about over the only parcels offering are very small ones, but the demand for kernels is good. Quotations—Brandis, 6d.; mixed soft shells, 5½d.; kernels, 1s. 3½d.

LIVE POULTRY.—The month's business in poultry has been very extensive, the facilities now offering for cold storage enabling buyers to secure and put away for Christmas requirements. As a result all quality lots have experienced keen competition, so that good rates have been secured for consignors. Good table roosters are worth 3s. 6d. to 4s. each; plump hens and cockerels, 2s. to 3s.; ducks, from 2s. to 3s.; geese, 4s. 6d. to 6s., according to condition; pigeons, 7d.; turkeys, from 10d. to 1s. 1d. per lb. live weight, for fair to prime table sorts.

POTATOES AND ONIONS.—As expected, prices for potatoes have receded, in fact the drop was a very sharp one. New season's potatoes are finding a market in increasing quantities, the warmer weather having hastened the ripening. Victoria is also offering new season's potatoes, and some W.A. tubers are finding their way to this State. Onions—Values for onions are also very much lower, and the prospect of a heavy crop throughout Australia helps to give the market an easier tendency still. Present quotations—Potatoes, new, £12 to £14 per ton on trucks, Adelaide or Port; onions, Gambiers, £6 to £7 10s. per ton on trucks, Adelaide or Port.

THE WHEAT MARKET.

The continued favorable reports received of the crop outlook in the Argentine and other wheat-growing countries caused, during November, a considerable decline in prices on the London market. This was accentuated towards the end of the month by the improved prospects of a settlement of the war between Turkey and the Balkan States. Prices locally fell in unison, and it is interesting to note that the rate, 8s. 6d., quoted on the 4th instant, corresponds with that ruling on the same date twelve months ago. It has been estimated that the Commonwealth harvest this season will total 81,000,000bush. compared with a little under 72,000,000bush. in 1911-12.

Dealing with the wheat position on October 25th, Beerbohm's states:—"Exports to date this season have been about 3,000,000qrs. larger than in the corresponding period last season, and as this year's world's crop, allowing moderate yields for Australia and Argentina, is a record one, there should be no difficulty in obtaining all the wheat wanted. In the three years ending 1911 the average yield was 437 million quarters, against an average of 392 million quarters in the three years ended 1908. This year's total promises to reach 450 million quarters, or 13 million quarters above the average of the last three years."

On November 1st the same journal reports:—"Crop prospects in some parts of Australia and India are reported to be rather less favorable, whilst too much rain has fallen in Western Buenos Ayres, but so far no serious complaints have been made. There is no particular change in the general situation, but the opinion now appears to be more general that there will be no serious complications in connection with the war in the Near East. If this proves to be correct the principal support of the market will be taken away, and, with the prospects of liberal shipments for some time to come, it may be difficult to maintain prices at their present level unless Argentine and Australian crop prospects deteriorate considerably.

"Shipments last week were again large, and estimating the present week's total at 1,500,000qrs. the total export to Europe, in the three months August to October, have amounted to the large total of 18,435,000qrs., against estimated consumptive requirements of about 16,250,000qrs. (1,250,000qrs. per week). This estimate of 1,250,000qrs. per week is based on total European import requirements of 65,000,000qrs. (after allowing for over 10 % of this year's crop being unfit for human food in the U.K., Germany, Holland and Belgium, and about 5 % in France), made up as follows:—

	Qrs.
United Kingdom	28,000,000
Germany	10,000,000
Italy	7,500,000
Holland and Belgium	9,500,000
France	3,000,000
Other countries.....	7,000,000
Total	65,000,000

Stocks in first hands at the present time only show a moderate increase compared with three months ago, but it is very probable that there has been a fair increase in second hands."

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Nov. 6	Dull and neglected	4/- to 4/1	4/3½ to 4/4	4/4½ to 4/5
7	Quiet; Liverpool, steady but quiet	Do.	Do.	Do.
8	Do.	Do.	4/3½	4/4
9	Do.	Do.	Do.	Do.
11	Do.	Do.	Do.	Do.
12	Quiet	4/-	Do.	Do.
13	Do.	Do.	4/2½	4/3
14	Do.	Do.	Do.	Do.
15	Weak, Jan.-Feb., 4/8½; Liverpool, easier tendency, Jan.-Feb., 4/8½	Do.	Do.	Do.
16	Quiet; Liverpool, steady but quiet	Do.	Do.	Do.
18	Do.	Do.	Do.	Do.
19	Dull, with easier tendency	3/11	Do.	Do.
20	Quiet; Liverpool, steady but quiet	Do.	Do.	Do.
21	Dull, with easier tendency	Do.	Do.	Do.
22	Do.	3/10 to 3/11	Do.	Do.
23	Quiet; Liverpool, dull and neglected	3/9	Do.	Do.
25	Do.	3/8 to 3/9	Do.	Do.
26	Steady, but quiet	3/8	Do.	Do.
27	Dull, with easier tendency; Liverpool quiet	Do.	4/2	4/2½
28	Do.	Do.	Do.	Do.
29	Firmer	Do.	Do.	4/-
30	Quiet; Liverpool market steady but quiet	Do.	Do.	Do.
Dec. 2	Do.	3/7 to 3/8; new 3/5 to 3/7	4/- to 4/0½	3/9
3	Dull, with easier tendency; Liverpool dull and neglected	old and new 3/7	old 4/-, new 3/8	Do.
4	Do.	Old 3/7, new 3/6	3/8	Do.
5	Dull and offered lower	Do.	Do.	3/6 to 3/6½
6	Firm, held for 3d. advance; Liverpool steadier but little inquiry	Do.	Do.	Do.

STEAMER FREIGHTS.—(December 4th)—Steamers from South Australia to United Kingdom—Continent, full cargo rates, new crop, 42s. 6d. per ton (1s. 1½d. per bushel); to South Africa, 32s. 6d. to 33s. 9d. per ton (10½d. to 10¾d. per bushel). Parcels, Port Adelaide to London, Liverpool, or Continent, 35s. per ton (11½d. per bushel); Port Adelaide to Melbourne, 8s. per ton (2½d. per bushel); to Sydney, 10s. 6d. per ton (3½d. per bushel).

SAILER FREIGHTS.—From South Australia to United Kingdom—Continent (Dec.-Jan.), 37s. 6d. to 38s. 9d. per ton (11¾d. to 1s. 0½d. per bushel); to South Africa, new season 28s. 9d. to 31s. per ton (9½d. to 10½d. per bushel).

RAINFALL TABLE.

The following table shows the rainfall for November, 1912, at the undermentioned stations, also the average total rainfall for the first eleven months in the year, and the total for the first eleven months of 1912 and 1911 respectively:—

Station.	For Nov., 1912.	Av'ge. To End Nov.	To End Nov., 1912.	To End Nov., 1911.	Station.	For Nov., 1912.	Av'ge. To End Nov.	To End Nov., 1912.	To End Nov., 1911.
Adelaide.....	2.01	19.53	17.93	14.54	Hamley Bridge	1.82	15.49	13.42	12.04
Hawker.....	2.75	11.03	11.76	7.74	Kapunda....	2.04	18.77	16.73	13.41
Craddock.....	2.27	9.83	11.30	6.80	Freeling.....	1.91	16.96	15.81	12.47
Wilson.....	2.39	10.68	11.37	6.40	Stockwell....	2.05	19.41	19.32	14.53
Gordon.....	1.90	8.22	10.67	6.58	Nuriootpa....	2.07	20.20	18.53	12.19
Quorn.....	1.62	12.90	15.02	7.24	Angaston ...	2.44	20.68	22.86	18.96
Port Augusta	1.69	13.84	10.67	7.51	Tanunda	2.96	21.00	27.66	19.75
Port Germein	2.10	11.48	11.46	9.35	Lyndoch	1.99	21.88	20.63	15.99
Port Pirie....	2.65	11.97	11.59	11.80	Mallala.....	1.87	15.83	13.55	13.51
Crystal Brook	2.39	14.19	14.16	13.48	Roseworthy..	1.71	16.51	13.38	11.20
Pt. Broughton	1.68	13.42	12.27	11.49	Gawler.....	2.07	18.32	17.09	11.84
Bute	1.66	14.45	12.10	14.53	Smithfield...	1.62	15.64	14.17	12.28
Hammond ..	2.02	10.00	11.14	11.32	Two Wells...	1.89	16.74	11.63	10.81
Bruce	1.65	8.37	11.77	6.24	Virginia.....	1.72	16.58	14.10	11.57
Wilmington...	2.43	16.77	18.80	14.04	Salisbury....	1.98	17.53	17.07	14.94
Melrose.....	2.23	21.81	19.67	15.47	Teatree Gully	3.41	25.13	14.66	17.37
Booleroo Cntr.	1.99	14.75	12.50	9.19	Magill.....	2.30	23.87	20.96	17.49
Wirrabara...	3.10	17.58	18.95	11.69	Mitcham	1.96	24.94	18.03	16.53
Appila	1.98	13.65	17.29	11.02	Crafers.....	5.85	44.24	39.99	37.35
Laura	2.58	16.62	15.02	13.42	Clarendon ...	2.66	37.48	24.80	26.82
Caltowie.....	2.29	15.95	14.31	14.10	Morphett Vale	1.86	22.42	16.93	18.57
Jamestown...	2.73	15.91	18.53	15.76	Noarlunga...	1.49	19.25	16.68	18.14
Gladstone ...	2.44	14.82	13.68	13.37	Willunga.....	2.35	24.91	20.44	23.95
Georgetown...	3.25	17.07	17.39	14.54	Aldinga	1.20	18.98	14.80	16.79
Narridy.....	1.98	15.89	13.89	14.67	Normanville..	1.00	19.76	15.01	17.85
Redhill.....	1.58	15.47	13.51	12.43	Yankalilla...	1.07	20.74	18.43	22.36
Koolunga....	1.71	14.77	14.04	12.16	Eudunda.....	1.38	15.93	15.40	13.85
Carrieton....	1.69	10.89	11.44	8.78	Sutherlands ..	0.64	—	9.41	8.26
Eurelia.....	1.76	12.18	12.51	9.17	Truro.....	2.08	18.40	22.27	14.69
Johnsburg...	1.57	8.94	10.80	7.31	Palmer	1.11	—	15.45	11.29
Orroroo	1.57	12.58	11.83	7.76	Mt. Pleasant.	2.15	25.91	23.53	18.76
Black Rock...	1.50	11.13	11.50	8.35	Blumberg....	2.63	28.45	25.12	20.88
Petersburg...	2.28	11.90	13.56	9.59	Gumeracha....	3.36	31.79	29.32	23.94
Yongala	2.10	12.66	12.85	10.92	Lobethal	3.69	34.37	29.50	24.45
Terowie.....	2.00	12.41	12.46	10.13	Woodside.....	3.12	30.13	31.31	25.67
Yarcowie....	2.01	12.64	12.88	11.44	Hahndorf....	2.56	34.92	25.29	29.70
Hallett	2.30	15.37	14.07	12.61	Nairne.....	2.03	27.91	22.46	25.89
Mount Bryan	1.81	14.86	14.61	11.53	Mt. Barker....	2.27	29.84	25.49	26.43
Burra.....	1.76	16.85	16.68	13.98	Echunga	2.74	31.26	25.90	29.34
Snowtown....	1.24	14.75	12.41	10.21	Macclesfield...	2.42	29.40	29.89	25.96
Brinkworth...	1.82	14.90	14.12	12.33	Meadows.....	3.07	34.10	29.44	30.79
Blyth.....	2.44	15.15	13.25	14.33	Strathalbyn..	1.42	18.18	16.11	18.66
Clare.....	2.52	23.27	19.44	19.43	Callington...	1.10	15.04	9.98	11.67
Mintaro Cntrl.	1.97	21.10	16.58	17.62	Langh'rne's B.	0.89	14.63	9.62	11.77
Watervale...	2.69	26.10	20.41	20.88	Milang.....	0.86	15.92	9.18	10.12
Auburn	2.11	23.10	16.17	18.47	Wallaroo.....	1.82	13.12	15.28	14.61
Manoora.....	1.67	17.26	13.15	12.68	Kadina.....	1.78	15.11	14.47	13.68
Hoyleton....	1.95	17.34	11.95	13.84	Moonta.....	2.02	14.35	13.93	12.66
Balaklava ...	1.77	15.12	11.56	12.87	Green's Plains	1.10	15.25	11.15	10.38
Pt. Wakefield	2.06	12.27	11.28	14.76	Maitland	3.12	19.22	16.76	17.32
Saddleworth..	2.14	19.01	14.28	13.12	Ardrossan ...	1.81	13.19	12.35	11.57
Marrabel ...	1.71	17.12	12.18	10.44	Pt. Victoria..	1.78	14.42	13.62	14.83
Riverton	2.19	19.66	15.21	15.17	Curramulka...	1.75	18.03	13.03	14.62
Tarlee.....	1.60	16.61	14.96	11.87	Minlaton	1.63	16.87	13.05	14.19
Stockport....	1.72	15.36	13.88	10.56	Stansbury....	1.75	16.30	14.66	16.07

RAINFALL TABLE—*continued.*

Station.	For Nov., 1912.	A'v'ge. to End Nov.	To End Nov., 1912	To End Nov., 1911.	Station.	For Nov., 1912.	A'v'ge. to End Nov.	To End Nov., 1912.	To End Nov., 1911.
Warooka....	1.57	16.00	12.53	19.44	Bordertown...	2.32	18.78	15.40	13.28
Yorke town ..	1.33	16.96	13.22	15.92	Wolseley	1.95	16.67	15.36	11.95
Edithburgh..	1.38	15.85	12.63	14.21	Frances	1.91	19.29	18.63	17.18
Fowler's Bay.	0.99	11.86	10.77	12.35	Naracoorte ..	1.90	20.99	21.68	18.11
Streaky Bay..	1.50	14.89	15.84	15.66	Lucindale....	2.44	21.67	23.26	20.55
Port Elliot..	1.61	15.69	18.73	17.72	Penola.....	1.54	25.32	23.65	22.39
Port Lincoln.	1.31	19.35	19.47	17.01	Millicent....	1.93	27.61	25.04	29.69
Cowell	1.86	11.22	11.08	10.37	Mt. Gambier.	1.86	29.91	27.42	30.64
Queenscliffe...	1.93	17.69	16.69	—	Wellington...	0.98	14.27	10.63	10.95
Port Elliot...	1.42	17.05	15.75	16.37	Murray Bdg.	1.05	13.33	9.81	10.11
Goolwa	1.22	16.94	16.50	17.07	Mannum	1.01	11.12	6.93	6.82
Meningie	0.96	18.08	14.04	14.02	Morgan.....	1.31	8.31	7.94	7.23
Kingston....	2.51	23.25	30.56	20.85	Overland Crnr.	1.90	10.47	9.00	10.09
Robe.....	2.00	23.65	19.73	21.11	Renmark....	2.06	10.06	8.77	9.66
Beachport...	1.84	25.86	21.67	26.75	Lameroo	2.42	—	15.63	12.43
Coonalpyn ..	1.11	16.62	14.89	13.14					

TO ADVERTISERS.

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AGRICULTURAL BUREAU REPORTS.

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* No report received during the month of November.

† Formal report only received.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

December 11th, January 8th, 1913.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, October 22.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O'Donoghue (chair), A. Wallace, S. Thomas, A. J. Phillis, Wm. Gum, T. Ward, E. C. Mills, D. P. Aitken, R. Brown, A. Crisp (Hon. Sec.), and two visitors

WORMS IN HORSES.—Mr. A. Wallace, in a short paper, stated that there were three varieties of tape worms, and seven of round worms found in horses; the former were a rare occurrence, but the latter were both very common and highly injurious. Continuing the paper said—"Those which are so common in horses are small round worms about 1½ to 2 in. long, pointed at both ends, and possessing a small black head. They inhabit the large intestines and the rectum, where they often exist in large numbers. Some of them pass away from time to time in the dung. When in large numbers, their presence will be betrayed by a ravenous appetite on the part of the horse, and a dry, coarse, staring coat, and pot belly. A whitish-yellow mould will be seen around the anus, probably made by worms crushed while passing out. The animal will also rub its limbs, tail, and anus against a post or wire fence. I find the most convenient and effective remedy is the following:—1 dram sulphate of iron, 1 dram tartar emetic, 2 drams linseed meal, mixed, and given as one dose, repeating it morning and night for a week; then give a purgative as follows:—1 oz. spirits of turpentine and 1 pint of raw linseed oil mixed. Sufficient accuracy in fluid measure for anything not violent in its action will be the following:—67 drops, or 1 teaspoonful, equal 1 dram; 8 drams equal 1 oz.; 16 ozs. make 1 pint." Mr. Gum stated that it was necessary to confine horses that were to be drenched, as otherwise it was difficult to determine whether the drench had been effective. Members generally agreed that the cautious administration of spirit of turpentine and linseed oil was a sure and safe remedy for this trouble.

FENCING.—In a short paper on this subject, Mr. T. Ward said a good substantial fence for this district could be made of gum posts set 14 yds. apart, with two T-iron droppers set between. Strainers should be placed not more than six chains apart, and the wiring from the top should be as follows:—First wire top of post, second wire 9 in. down, third 14 in. down, the remaining three being set 6 in. apart; this would make a six-wire fence, 3 ft. 4 in. high, with the bottom wire 5 in. from the ground. The first and second wires should be barbed, the third No. 8, and the remainder should consist of No. 10 gauge. When commencing a fence, it was advisable to put up the first strain, strain the two barbed wires, tie the standards, and then commence the next strain. The four plain wires could then be run through and strained, and the fence completed in this manner. It was a good plan to insert an old bolt in the strainer, against which the strut should be placed. Care should be taken to keep the boring straight, and ¼ in. bits would be found large enough. Posts 5 ft. 2 in. long, placed 22 in. in the ground, would be found large enough; the strainers should be 6 ft. 6 in. in length, and the standards 4 ft. Mr. Brown thought 14 yds. was too far between the posts, and Mr. Wallace advocated ¼ in. holes, because the wires were not so liable then to rust in the posts. Mr. Gum thought the smaller the hole the better.

Coomooroo, October 21.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berryman (chair), J. Brown, L. Avery, H. Fisher, C. Phillis, E. Brice, A. Cooke, W. Robertson, R. G. Polden (Hon. Sec.).

FARM IMPLEMENTS.—In a discussion on this subject, Mr. Robertson said that it was a mistake to allow the wheels of implements to become dry of oil. If care were given to this, the life of the implements would be considerably lengthened. Mr. Berryman advised covering the farm implements with boiled oil in preference to paint, and he advised the farmers generally to varnish their own buggies. Mr. Brown mentioned that it was necessary to clean away any old oil from bearings, and carefully remove grease from machinery before putting it away.

WOOL-CLASSING.—Mr. Berryman expressed the view that it was inadvisable to take off greasy and sweaty locks from around the legs of fleeces. He would keep the yellow from the white and silky fleeces, where small clips were being dealt with. The Secretary advised classing wool however small the clip, and recommended the careful skirting of all fleeces. Some of the members did not favor the idea of classing where the small flockowner was concerned.

Mount Remarkable, October 24.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. M. S. Giles (chair), J. McIntosh, L. A. Bauer, W. Oldland, T. H. Casley, E. B. Andrews, E. Mayne, and H. H. Davie (Hon. Sec.).

FALLOWING AND CULTIVATING.—Mr. T. H. Casley read the following paper:—"It is recognised by all that the fallowing system is the only way of successfully farming. No one cares to revert to the old style of cropping the same ground every year without giving it a spell. When the land to be fallowed is selected the farmer should always plough in the opposite direction to that in which it was previously ploughed. There should be no necessity to trust to memory; this should be on record in the programme of previous years. Every farmer should keep an account of his working, as it is very handy to refer to for many purposes. He should also know to what depth he ploughed the land last. I do not believe in always ploughing the land to the same depth, as a hard floor is thus made, and this floor gets almost polished and impervious. In this district the land varies in many respects. I will deal more particularly with the average land. Before commencing to plough, the plough itself should be thoroughly overhauled; because if it does not work properly the after effects are noticed for years. Select a nice level piece of ground. Let the plough down, see that each share fits properly, and that all have the same pitch. Also see that each mouldboard is rigid and set to the proper width. Above all do not spare grease or oil, because both are much cheaper than new parts. In setting out the lands much depends on the size of the plough—the larger the implement the bigger the lands. I do not believe in ploughing all round the paddocks. It would be ridiculous to strike out an 80-yd. land for a three-furrow plough, because the headlands would become so hard by constant walking that it would be a difficult matter to plough them properly. A strike-out should be as straight as possible. The furrow wheel should be lifted to the same height as the depth to which you intend to plough. This precaution is rarely taken by ploughmen in striking out or forming the crown. When once the land is struck out straight care should be taken to keep the work straight. What are known as 'pig-troughs' are caused either by the team not being looked after properly or the furrow horses leaving the furrow. Care should be taken to have a good horse or horses for that purpose. Ploughing of the pig-trough variety leaves large strips of ground unbroken, and becomes a nuisance when cross-working with other implements. The time for fallowing depends on circumstances. It is now understood by all up-to-date farmers that the sooner it is commenced the better. Strength and big implements are essential to success; because if a farmer starts fallowing with a small plough, and rain falls whilst he is ploughing, the land he ploughed first gets very dirty before he has time to start killing the weeds. On most farms the paddocks are not uniform as to condition; there are soft and hard spots alternately. A good ploughman knows that when he strikes a hard patch he should drop the plough a notch or two, and when it is soft he should lift the plough. To ensure success the shares should be kept as sharp as possible. If using cast shares they should be chipped frequently, and plated shares should be kept in proper cutting trim. This does not apply to land that can be ploughed through the whole season with the same set of shares. When the paddock is finished, the headlands should be carefully done. I find it pays well to do a few rounds inside the places where the plough has been lifted, because in some cases the plough is drawn closer to

the fence than in others. It is a mistake to allow horses to run loose on land whilst it is being fallowed, because they roll on the soft ground, and these rolled spots after a shower of rain become very hard. The method of working the fallow depends to a great extent on the nature of the soil. Working should be done before the weeds get a start. The best time to exterminate stinkwort is when the plant is from 2in. to 3in. high. Much depends on the class of implements used for the working of fallowed land. To ensure the quick growth of weeds the fallow should be cross-harrowed as soon as possible after a rain—the harrows thoroughly level, and pulverise the ground. Harrow tines should be kept as sharp as possible, and none should be absent, because missed strips are noticeable later in the season. I advise those farmers who have no stony patches to use the disc implements; but for land that has patches of stones, and hard and soft land, the stump-jump skim plough is best for turning under weeds of all kinds. In these implements, just as is the case with the plough, each furrow should do its work. If not, the implement can be tracked for years after. I find the harrows are about the best implements with which to work the land after the disc or skim ploughs have finished—especially after a rain. Good sharp harrows keep the surface even, and help to a great extent to conserve the moisture, which, in the main, is the principle of good farming. Before seeding I prefer a rain. Wait a few days, then skim and harrow. A light roller used before drilling makes the ground more even and a uniform germination is secured. To be successful, a farmer should pay great attention to the details I have mentioned. It is not the man who puts in the greatest number of acres that is the most successful. I contend that land, if properly worked and kept in good condition to receive the seed, pays far better if, say, 100 acres are well done, than if 300 acres are put in any way: because a nine-bag crop on 100 acres is equal to a three-bag crop on 300 acres in cash value. The advantage is obvious in respect to the ground that has to be traversed, and the wear and tear on implements, use of oil, &c., and the extra work for the teams are all economised. In fact, the man with the 100 acres could have marketed his crop before the other with the 300 acres had finished reaping."

Wepowie, October 29.

(Average annual rainfall, 12in.)

PRESENT.—MESSRS. J. Crocker (chair), J. Rielly, C. Pearce, C. Knauerhase, M. Irvine, G. Rooke, J. and T. F. Orrock (Hon. Sec.).

CUTTING AND STACKING HAY.—Mr. Irvine read the following paper:—"It is important to cut hay as soon as it is ripe, as over-ripe hay decreases much more in value of straw than it gains in grain. If a crop to be cut has a quantity of oats in it, say half or more, it is a good policy to cut it when the oats are fit, no matter at what stage the wheat is. Besides making good feed for stock the oat kernels will be taken off the land, and it will be noticed the next time the ground is fallowed that the crop is clean, except where stooks have been placed. I prefer stooking up as soon as possible after the binder to keep the sap in the straw. For quick carting a small round stook of about 25 sheaves is a good idea. If the hay is to be left in the field for any length of time long stooks are better; a row up the centre with two sheaves deep on either side. This will not easily damage, as air can pass through it. Since binders have come into use a good amount of hay has been spoiled, or partly so, by being stacked too soon. It is not wise to stack earlier than two weeks after cutting unless under very dry conditions. Take a sheaf from the middle of the stook and a handful of hay from the centre of the sheaf; if, by twisting this round between the hands, you can secure moisture, it is too soon to stack. Wood makes the best dunnage for a stack. Straw also answers very well if a fair amount is used in building. The proper way to build a stack is to place the butts out, keep the centre of the stack full, and spring the walls so that the water from the roof falls clear of the sides. Sheaved straw makes a good covering. Put the sheaves on in the string, butts outward, peg the first row with a wooden peg and knock them up even with a thatcher's bat. The last row at the top should be reversed and have a wire put along the top row of sheaves. A light rail for the other end of the sheaf is all that is necessary to keep this covering on, and it will pay for itself many times over in a wet winter."

NOXIOUS WEEDS.—Mr. Joseph Rielly dealt with this subject in a paper as follows:—"To the landholder who takes pride in keeping his land free from weeds, the carelessness of his neighbors, who neglect to destroy even the worst kinds, is a continual source of wonder and loss, as while a farmer can keep down the weeds that grow on his own farm he has no defence against the seeds that blow in from his neighbor's. Of course, we have the Noxious Weeds Act, but, unfortunately, it is not as effective as it should be, and many landholders neglect to destroy the weeds on their land. Unfortunately, the careless one

usually has a friend in the council. The average district councillor dearly loves to exercise a little patronage; his plain duty is often forgotten in the desire to do a turn for a friend. Even when the council does attempt to enforce the Act the business part is of necessity left to the clerk. Now, prosecuting people is not a labor of love with the average district clerk. It makes a lot of work for him and it also tends to make him unpopular. One way and another the business is allowed to drag on until it is too late to do anything effectively that year, and one year is very much like another in this respect. If by some extraordinary chance a case does come before the court the defaulter has many things in his favor. There is the wording of the notice, the method of delivery, the time allowed for destruction, and the question of inspection afterwards. The ratepayers, including the men who are careful to keep their own land clean, have to pay all the costs. In the meantime the weeds have gone to seed. The Noxious Weeds Act is good and necessary, but it should be impossible to evade its provisions. As this question chiefly effects the man who is honestly trying to get the best out of his land, *i.e.*, the working farmer, I think it is time that the farmers, through their own Parliament, took a hand in drafting a Bill for an Act that would be workable. I venture to make a few suggestions. In the first place I would do away with the necessity for giving notice, that is personal notice, altogether. A notice in the *Government Gazette*, or posted at certain conspicuous places, as is done under the Prevention of Fires Act, should be sufficient. Then any person who had noxious weeds growing on his land after a certain date, say November 21st, would be liable to prosecution. I would not limit the right of action to the district council, and see no reason why the adjoining landholder should not have that right, as he is the party most interested. If he brought a spiteful or frivolous charge, the court would punish him by making him pay all costs. Local Branches of the Agricultural Bureau should also have the right to deal with cases within their sphere, and it would not be a bad idea if offenders' names were struck off the roll of membership of Branches. I wish to refer briefly to a paper on this subject read before the Port Germein Branch by Mr. Hillam and appearing in the *September Journal*. Mr. Hillam is wrong in stating that star thistle had spread all over the country before being proclaimed a noxious weed. The fact is, it was proclaimed as soon as it got outside the boundaries of a certain sheep run. The small farmers at that time were very anxious to have the weed destroyed, and were continually worrying the council over the matter. Somehow the large estates kept control of the councils, their managers always held a seat, and generally occupied the chair. They openly flouted the Act, and the present state of a large part of country is the direct result of the selfish action of these men. Mr. Hillam thinks it is too late to grapple with the matter and that great hardships would result from drastic measures to enforce compliance with the Act. He also states that many landholders would throw up their land rather than try to clear it of star thistles. The hopeless cry "too late," does not apply in our district, our land is still clean. Even in the worse districts it is possible with closer settlement to keep them in check, and in time to eradicate them altogether. As to hardships, any man who is honestly trying to clear his land is not likely to be troubled by anyone. As to the man who would throw up his land rather than clear it, I think the sooner he throws it up the better; the fact would be proof positive that he had more land than he could use, and there are plenty willing to take it. It would be easier to clear than mallee scrub. In conclusion, let me emphasize the fact that this and similar Acts are framed in the interests of the men on the land, and the landholder who opposes it is standing in his own light. Land is now much too valuable to waste in the production of useless weeds. I have no doubt that every member of this Branch will do his utmost to keep his own plot clean, and whilst thus benefiting himself he will encourage others by his example."

Wilmington, November 20.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. A. H. Noll (chair), Slee, Zimmermann, D. and S. George, J. Schuppan, G. Schuppan, Hill, Farrell, McGhee, E. J. Gloede, and B. Jericho (Hon. Sec.).

BREEDING HORSES.—Mr. Farrell contributed the following paper:—"As an adjunct to farming, the breeding of horses is a great help. First, we must decide on what we are going to breed. In my opinion the Clydesdale is the horse for the farmer, because he has on his farm in most instances a few mares that are admirably suited for breeding purposes. They are both active and quiet and tractable in working, and will in most instances command a good price if sent in to the market. After selecting the mares, the next matter is to choose the sire. The wisest course is to take only the best that is offering, second-raters should not be tolerated. The paying of a little more in service

fees for a good animal will be found the cheapest in the end, as a better foal will more than compensate the initial outlay. Bad-tempered animals should not be used either as brood mares or as sires, as there is always the probability that defects in either animal will be transmitted to their progeny. Mares are all the better for being worked while in foal, as if not worked they are liable to get too fat, and then there is the danger of trouble at foaling. The foals should always be handled as soon as possible and kept quiet, as they never forget it, and are not so much trouble at breaking time. They should be left with their mothers until six months old, and when taken away should be kept well fed on chaff and bran and any green fodder that can be had at the time, and not turned out until the grass is sufficiently strong for them to do well on it. If fed properly they will not be stunted. When breaking time comes they should be carefully handled and mouthed; be firm but never bully. Firmness and quietness will do far more good than the whip and noise. When thoroughly handled the colt should be put to light work along with other good movers, with a view to teaching him paces. Never put him in a heavy load at first, as he may get stuck, which will probably teach him to jib. Sometimes jibbing is inherent, but in most cases it is learnt by the foal when being broken in." Mr. Noll pointed out that there were two types of Clydesdale—the "Shire" type and the "Modern" type. He thought the latter more suitable for the ordinary farm work. Mr. Slee thought horse-breeding did not receive the attention that it should. Breeders should choose the best and soundest sires and mares. He would rest mares when being served, although there were always exceptions to this contention. Mr. Farrell agreed that for farm work probably a little blood in draughts was desirable. He pointed out that mares should be worked to within four weeks of foaling, and also worked during the time of being served, but not when in season or during the day of service.

Wirrabara, November 23.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. P. Lawson (chair), S. Thistleton, A. E. Stott, C. F. H. Borgas, W. H. Stevens, J. F. and E. Pitman, C. H. Curnow, W. Bowman, G. Hollett, H. E. Woodlands, and A. R. Woodlands (Hon. Sec.).

DESTROYING RABBITS.—Mr. Stevens reported that the system of tarring rabbit burrows had worked successfully where the ground was solid, but Mr. Pitman had not met with any success with the scheme. Mr. P. Lawson said bisulphide of carbon placed on pieces of bag and thrust well into the burrows, which were then made airtight, was most effective. Mr. H. E. Woodlands mentioned that carbide of calcium was equally good and much cheaper.

RUSTY NUTS.—These could be loosened by applying eucalyptus instead of kerosine. A very effective procedure was to bind a kerosine-saturated rag around the nuts and apply a light to it. With the assistance of the heat little difficulty should be experienced in removing the nuts.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Crystal Brook, September 28.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. M. P. Pavy (chair), W. J. Venning, R. R. Shaw, J. Pridham, B. Flavel, G. A. Solomon, J. Teakle, R. Heaslip, J. Duffield, A. Macdonald, W. Hutchinson, B. Weston, W. Carmichael, W. W. Lovelock, H. Sutcliffe, W. Jasper, H. Billingham, G. Miell, A. Story, V. Sargent, A. E. S. Clarke, W. W. Robinson (Hon. Sec.).

STRAW.—This subject was dealt with in the following paper by Mr. B. Weston:—"A little more than five years ago I built a stack of straw 9yds. long by 10yds. wide, finishing it off with a nice round top. During the winter months of two years the cows went to the stack every night for their bed. Whichever way the wind or rain was coming, the stock could always get good shelter, and this is undoubtedly a great benefit to cows

in milk. I used all Gluyas straw; I wanted it for shelter, and it answered the purpose splendidly. Although the stock have eaten a large part of it, the stack is standing to-day, except that the top was blown off about a month ago. I have since built two stacks of Marshall straw, and the stock have eaten both of them. I have also built another of Gluyas for shelter. I would recommend any farmer who has good straw to put together a stack as soon as possible after harvest. A few months back young horses and cattle would readily eat any clean straw that they could get, and no doubt the time will come again. Let us be prepared for it." Mr. Shaw, in discussing the matter, said straw properly stacked was of great assistance in tiding stock over dry periods, and also as shelter. Mr. Miell advised building a straw stack every year, and Mr. Teakle also thought this made good fodder for stock. A few years ago he mowed a good sized stack and mixed one sheaf of straw to three or four sheaves of hay, but he would not advise putting too much straw with the hay, as there was a possibility of harmful results. Last year Mr. Clarke had stacked a large amount of straw, mixing salt with each layer. His cattle had done remarkably well on it, but nevertheless he did not think it advisable to combine stock-raising with the growing of wheat to any considerable extent, as the stock cleared off the grass, &c., which should be utilised in the soil.

Georgetown, October 26.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. W. J. Freebairn (chair), M. J. McAuley, A. Erichsen, W. Hill, Geo. Hill, E. Hewitt, J. Fogarty, A. Thomson, P. Higgins, A. Freeman, J. Myatt, S. Eyre (Hon. Sec.), and one visitor.

FARM BY-PRODUCTS.—Mr. J. Myatt dealt with this subject in the following paper:—"Every farmer should keep a few sheep. If he has a small holding it is not advisable for him to rear lambs, but to have some reserve feed, and purchase good young store wethers, about three years of age, off the shears, or in February. I prefer real good Merinos, as with crossbreds there is a difficulty in keeping them in the paddocks. If you have a fairly large holding in a suitable locality mate 100 large-framed full-mouth Merino ewes with two Shropshire or Dorset rams, and when the lambs are five months old they should realise 12s. per head; this, with an 80 per cent. lambing, is equal to a return of £48. You could also breed another 200 lambs for stock. They should be pure Merinos by the best rams that are procurable. Cows are another good addition to the farm. Three good cows kept and fed well should average £10 worth of cream per cow per annum without any very special feeding. They should have a liberal allowance of hay when the feed is scarce, and a bran mash occasionally with a few packets of Epsom salts—this would obviate trouble with dry bible. Each cow should be tested separately, and if she is not strong in butter fat dispose of her. I prefer the Shorthorn cow of the milking strain crossed with the Jersey bull. A few pigs can be reared on the farm and sold when they are about eight weeks old. If you have plenty of feed keep them until they weigh about 80lbs. and sell as porkers, not forgetting to keep a few to cure for your own bacon, for which purpose they should weigh about 120lbs. Poultry is an industry that is sadly neglected on the farm. First-class young table roosters will always bring a good price. I have reared cockrels which, at five and a half months old, weighed 7½lbs. (live weight). These would realise 7s. 6d. per pair at present. Mate Wyandotte, Orpington, Langshan, or Plymouth Rock hens with Indian Game, Modern Game, and Old English Game cocks. Do not keep any hens for more than three years. Turkeys are very profitable in picked localities, and good birds will realise from 10s. to 12s. each, and they require very little attention. Every farmer should have a small vegetable garden and grow his own vegetables during winter and spring. A nice flower garden and shrubbery will provide an attraction on any farm."

CAPE BARLEY.—Mr. J. McAuley reported having ploughed and sown with 80lbs. of super, and about 6bush. of Cape Barley an area of four and a half acres. This crop carried five cows, five calves, and four mares and foals for three months. This stock was removed from the paddock about a month ago, and he expected to reap about 20bush. of barley or three-quarters of a ton of hay per acre.

Leighton, October 24.

PRESENT.—Messrs. A. McDonald (chair), J. McDonald, I. J. Warnes, D. Williams, E. Jettner, R. McWaters, J. Earle, W. Morgan, R. Fairchild, T. Goodridge, A. E. McWaters (Hon. Sec.), and four visitors.

WORMS IN HORSES.—Mr. Goodridge read a paper on this subject, in which he reported the loss of a two-year-old filly, the death of which was indirectly due to worms. On making a *post mortem* examination he found the heart clogged with a mass of slimy matter, containing little air cells. He attributed this accumulation to the worms eating their way into the small blood vessels, passing to the heart, where they formed a mass large enough to choke the main artery. The provision of rock salt always available was a good preventive measure. Unlike the larger varieties the thread worms did not affect the condition of the horse to any extent. These parasites fed on the lining of the stomach, and while they did not deprive the horse of its food they destroyed a certain amount of the secretion which was necessary for the proper performance of the digestive function. Careful attention to feeding, stabling, and grooming horses would do a great deal in the direction of keeping the animals free of these pests. Mangers should be scalded occasionally: this would destroy any parasites lodged there. Members were of opinion that if more well water and less dam water were given to horses there would be less trouble with worms.

Mount Bryan, October 28.

(Average annual rainfall, 15½ in.)

PRESENT.—Messesrs. J. Tralaggan (chair), Wardle, Schmidt, Thomas, Stewart, Price, Nutt, and H. L. Hatherly (Hon. Sec.).

FALLOWING.—Mr. Thomas contributed the following paper:—"In a district such as our own there cannot be any fixity as to the correct way to work fallow, for not only do the soils differ to a great extent, but the circumstances also are very varied. One season we are blessed with early rains to start all weeds, thus enabling us to kill them by cultivating, whilst the next year we have totally different conditions. So a set formula is not workable. Each season presents totally different problems, which have to be met in totally different ways. All will agree that for convenience and effective working land must first be freed from all obstructions, such as stubble, &c. The ploughing should be done to a depth of, say, 4 in. to 5 in.; 4 in. being a suitable depth for new land, whilst 5 in. meets the case in stubble or old land. Ploughing should commence the first week in June, and be continued as expeditiously as possible until the middle of August at the latest—for two acres ploughed early and worked during the spring are worth three ploughed late and worked indifferently. Land ploughed early has every opportunity of absorbing all the winter rains, and also of consolidating again; which, in dry seasons, is a very important feature. To illustrate my meaning take the case of land that has been broken up dry, and consequently is lumpy. It will be found at seeding time, however you may work the top, it will have recesses or cavities below the seed bed, which are known to have a detrimental effect on the wheat plant. Land that has been ploughed early will be entirely different, for it will become firm. Certainly there are arguments against early ploughing, especially in close clay soil, but even this class of soil, if ploughed rough and not broken down too early, may be worked in this way. Sandy or loamy soil should not be broken down before the middle of August, for it is very liable, in the season of continuous rain, to become flat and set too close. Harrowing is usually more neglected than overdone, and I believe it pays to give it more attention. New ground especially should be harrowed twice with heavy harrows. The result will then be better work by the cultivator. Cultivating must be pushed on with where the soil is at all inclined to consolidate and become crusty, or it will be found a horse-killing operation to work the land to any depth. It might be well worth a farmer cultivating his fallow twice during the spring. In a district where the rainfall is sometimes light, such as we have here, the conservation of moisture in the soil is a very important feature. Certainly the experience of the past few years has not very strongly exemplified this, but nevertheless it is an important lesson which we may learn in the future. If we wait until after the heavy rains are over, and the ground is beginning to dry, so that we can by once cultivating kill all weeds, especially where there is stinkwort, we lose the opportunity of conserving moisture. During the last few days I have examined the soil which was cultivated early, and I found it damp to within ¾ in. of the surface; so damp in fact that weeds are still coming up on it. On the fallow which was only harrowed, and is being cultivated now, the moisture has nearly gone, leaving the soil crusty and solid to work. The question is, will it pay to do the double cultivating? Personally, I believe it will, but I should also like to hear the opinion of the other members on the subject. The farmer of the future must not only have a fair mechanical, but also a smattering of scientific, knowledge, for the time is fast advancing when soil will require a more unique method of manuring. At present we have many different classes of soils on the farm, but we usually use only

one kind of manure. This is certainly a mistake, but with the farmer's lack of scientific knowledge he is not able to decide for himself how to do otherwise. As time goes on it will become expedient for him to see into all these details."

North Booborowie, October 23.

PRESENT.—Messrs. Ashby (chair), Dunston, Birks, W. Tall, Morgan, W. Giles, K. and F. L. Phillips, W. C. and F. C. Catt, Smart, Mayfield, Roberts, Murphy, Storr, Sullivan, Barbour, Simpson (Hon. Sec.), and five visitors.

HAY-MAKING.—Mr. E. J. Dunston read a paper as follows:—"It is a wise plan to cut sufficient hay each season to allow for having some on hand at the succeeding hay-making. If stock are to be fed on hay I would advise cutting it fairly green, about a week after the bloom has come out on the head. It is then very sappy, and horses will eat it very readily. If the hay is to be chaffed I would cut it at a riper stage, when the grain has fairly well formed in the head. It is profitable to use chaff in preference to hay, as there is not the waste about it. If stock are fed constantly on chaff they prefer a change to hay for night feeding. If the hay is to be carted early after cutting I would allow it to lie a day before stooking, then put it into stooks of about 20 sheaves each. With ordinary summer weather it should be ready for stacking in 10 days or a fortnight; when the straw is brittle and will break at the joints it may be safely stacked. If stacked before sufficiently dry it is liable to sweat and discolor. The varieties of wheat I would advise for hay are those which grow a clean, bright straw, with plenty of flag, viz., Bluey, White Tuscan, Lott's No. 2, and King's Early. If the hay is to be chaffed I would mix oaten hay in the stack with wheaten hay, but would not feed oaten hay long, as stock eat the heads and leave the straw more than is the case with wheaten hay. It is profitable to chaff for winter feeding, as stock waste a great deal of hay when it is damp and tough. Where stubble land is cropped it is advisable to cut hay from that in preference to crops on fallow land, which frequently grow very rank. Build the stack north and south, as the sun then dries each side alike should it get wet before being thatched. Thatching should be well done with clean straw as soon as it is available after harvesting." Mr. Mayfield preferred hay cut just prior to flowering when it was to be fed to cows, but for horses doing hard work it was advisable to have it a little on the ripe side. A good fodder resulted from a mixture of White Tuscan wheat and oats. Mr. W. Giles was convinced that horses did better on oaten than on wheaten hay. Mr. Roberts thought oats should be fed for strengthening whilst wheaten hay was best for fattening. Hay for chaffing should be cut ripe, but that intended for feeding long should be cut on the green side. Mr. Murphy preferred solid straw, but Mr. Dunston considered that while the solid straw weighed well, it was not so good for stock. Mice generally did more damage in a stack when oats were in it. It was more payable to reap oats to crush and feed with wheaten chaff than to cut oaten hay.

Port Pirie, October 5.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. E. B. Welch (chair), T. Johns, W. Munday, F. A. Johns, D. L. McEwin, H. G. Hawkins, T. B. Jose, H. and A. M. Lawrie, E. J. Eagle, and W. R. Wright (Hon. Sec.).

CLEANING AND MARKETING WHEAT.—Mr. Munday read a paper as follows:—"In the interests of those engaged in the wheat-producing industry, to my mind, to secure full value for the time, money, and labor spent in its production, it is necessary that more attention be paid to the cleaning and grading of same preparatory to placing it upon the markets of the world. It is somewhat of an anomaly to find that whereas in almost every other industry no time, money, or labor are deemed too great for the preparation of the various products in the most attractive manner possible, the wheat producer, with few exceptions, detracts from the value of his efforts by neglecting to pay attention to the proper cleaning and grading before marketing. While, it is true, there are a few amongst the producers of grain who take a delight and pride in thoroughly cleaning and preparing the grain, yet, I fear, there are many who are somewhat remiss in this respect, and who consider that, providing the sample, as taken direct from the harvest r, is up to the standard fixed by the Chamber of Commerce, the time spent in putting the grain through the winnower is so much time and labor lost. I am convinced that the enhanced value of the grain, if thoroughly cleaned, would more than compensate for the extra expense incurred in so doing. It is true, providing the crop be a fairly clean and

heavy one, and due care be exercised by the man engaged in manipulating the harvester, a fairly clean sample will result, but the amount of refuse in the cleanest grain, direct from the harvester, when shot and put through the winnower will be surprising. There is another, and, to my mind, important aspect involved in the preparation of wheat before marketing, namely, freight. It must be borne in mind that the broken and inferior grain and rubbish have to be paid for at the same rate of freight per ton as grain of superior quality and cleanliness, and while tending to injure the reputation of our grain in home markets goes eventually to feed the stock and enrich the fields of foreign countries, and by so doing enhances the cost to the local producer of the milling offal, such as bran pollard, &c. By thoroughly cleaning the grain the broken and inferior rubbish, if extracted, could be more profitably used upon the farm. I know there are a great number of farmers who will argue that it does not pay to spend more time and labor than is necessary just to secure an average f.a.q. sample, seeing that the wheat trader bases his prices upon those ruling in the world's markets, and upon the standard sample as fixed by the Chamber of Commerce. But I would point out that both grower and trader are partly to blame for this state of things; the grower, by neglecting to thoroughly clean and prepare the grain samples before submitting them to the Chamber of Commerce for standard purposes, and, secondly, the trader for not encouraging better methods of cleaning and preparing the grain before offering same for sale, by failing to give more per bushel for grain of superior quality and cleanliness. It is just here, to my mind, that much of the fault of placing upon the market wheat containing far too much rubbish lies. Probably from the trader's standpoint it is a matter of indifference, so long as he can dispose of the grain at a profit, whether it be properly cleaned and graded or not, and he may argue that the grower has no right to complain if he is paid the same for his inferior stuff, provided it complies with standard requirements. While this may be true to some extent. I hold that while we find in every other industry that it is quality that pays best in the end, it is only feasible to suppose that the same principle will apply to the wheat industry. Were nothing but clean and sound grain placed upon the market it follows that it must command a better price. Both traders and producers should co-operate in an endeavor to place upon the market wheat thoroughly cleaned and of finest quality, and thus enhance the value and reputation of Australian wheat in home markets. Then, again, there is another aspect of the wheat industry and marketing of same, which, to my mind, is far from satisfactory, namely, the storing of wheat with the trader prior to sale. While it may be an advantage to the grower to get his product away at the earliest moment instead of storing it in his shed or barn upon the farm, yet it must be borne in mind that the grower has to pay all the cost in connection with the housing and storing of same with the wheat merchant, and he can rest assured these items are calculated by the trader in basing his prices for the grain when purchased. I think this custom of storing with the trader shows a very confiding disposition on the grower's part, and speaks volumes for his faith in the honesty and business integrity of the trading fraternity. Without questioning for a moment these admirable qualities of our wheat traders I feel assured it would be greatly to the interest of the wheat producers to devote some of their cash to the purchase of sites, and the erection of sheds and stores at the outports and other centres for the reception and storing of the grain. They would thus retain full control until it was disposed of. With a view to inducing competition amongst wheat buyers they could offer and sell same by public auction in lots sufficiently large to ensure sales at a satisfactory figure. This would also minimise and tend to reduce the cost of running so many agencies, and retain for the producer the profits which now go to swell the banking account of the trader."

Redhill, October 29.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. W. Stone (chair), McAvaney, Coffee, J. J. Hayes, E. Steele, Briggs, Pengilly, W. J. Burton, Robertson, Jackson, F., P. H., and F. A. Wheaton (Hon. Sec.), and three visitors.

HARVESTING.—The following paper was contributed by Messrs. F. and F. A. Wheaton:—"We foresee a change coming in the near future, for this district at all events, in the system of harvesting. The defects in the modern complete harvester are that every machine loses a certain amount of wheat, however good it is or however competent the driver. If a rain falls soon after a crop is harvested, shoots of wheat will be seen, no matter what machine has been used. Professor Lowrie, speaking at Crystal Brook last March, said he could not understand why farmers continued using harvesters when lighter and more effective implements were available; and when an authority

such as Professor Lowrie voices his opinion in such a manner there must be something in it. A harvester will not take a large foreign plant—*e.g.*, a turnip—through the comb or damp weather arrangement, and the driver has to stop and pull out the choke, thus wasting a certain amount of time. Perhaps the greatest defect lies in the fact that the seeds of wild plants, such as turnip, mustard, &c., are re-distributed, much to the detriment of the succeeding crop. If wheat lodges as a result of bad weather, or other causes, it is impossible to get all of it with the harvester. It is impossible to reap during damp weather; some grains are left unthreshed on the stalk, and part of the head is not threshed at all, but thrown out over the machine. This defect represents a serious disadvantage and loss to the farmer in a bad stripping season. Another point which, however, does not directly affect the farmer, is the uneven sample of wheat which is sometimes sent in to market. It is impossible to get an even sample, and at the same time always rely on getting the maximum result, for, if the crop is left till all is perfectly ripe, there is a chance of a large amount of grain being shaken out by a strong wind. Therefore it is obviously most economical to reap as soon as possible, *i.e.*, as soon as the machine will thresh the heads; but it is noticed that some parts of the crop are not quite ripe, and so the grain goes into the bags in a more or less unripe condition, much to the detriment of the sample. This must have a prejudicial effect on the sample of wheat that a country produces. It is readily understood, however, by all farmers that the great advantage of the use of the harvester is that it is a labor-saver, and this fact alone has, up to the present time, outweighed all its defects. Most of these remarks will apply to the ordinary stripper, but the advantage presents itself that you get a more even, marketable sample, as any green grain will ripen in the heap, but there is more time wasted in emptying the machine. With regard to the reaper-thresher, several advantages present themselves, and the first is that you are not troubled with chokes, as the wheat heads and anything else are cut off with a knife; and, secondly, it is easier to get wheat that has gone down with the reaper-thresher than with the harvester. This machine has not such a heavy draught, and takes a wider cut than the harvester. A great disadvantage with the reaper-thresher is the big strain on the horses and the machinery when starting. To overcome this difficulty it might be possible to incorporate an engine with the reaper-thresher to drive both the stripping and threshing machinery, and to propel the machine itself by separate gears. This would enable the stripping machinery to be set in motion at full speed before the machine entered the crop. We are of opinion that this method of using reaper-threshers would be preferable to hooking machines on to a tractor. The system of harvesting which we judge to be superior to any mentioned above is binding and threshing, and as the paper proceeds we hope to give you some logical reason for our recommendation. The thresher is portable, and can therefore be set down in the paddock where the crop is. The wheat is carted to the thresher direct from the stook. The straw, when leaving the thresher, is stacked as required, or is pressed, and cocky chaff is thrown into a heap. The machine can be driven by the farm tractor, which will be coming into general use. The advantages associated with this system of harvesting are as follows:—(1) You are able to start harvesting 10 or 12 days earlier than you can with harvester. The crop can be cut as soon as the doughy stage is reached; the grain ripens evenly and you get an even sample of seed. (2) The straw which you obtain from the thresher is more palatable to stock than stripped straw, and is also of better feeding value, as it is so much greener. Straw can be stacked till needed, and in a year like the present a few stacks of good straw would come in very handy. (3) The trouble that is experienced in the matter of chokes when stripping is overcome by the use of the binder. It is a much more easy matter to clean land of weeds, and in a district such as ours, where mustard and turnip thrive so magnificently, this is a great advantage. (4) The stubble land is so much easier to plough, and the straw does not need to be burnt off. (5) Perhaps the greatest advantage lies in the fact that you can cut the crop before it has a chance to lodge or shake out. Even if the crop does lodge it is a comparatively easy matter to get it with the binder. We have known half of a 30-bush. crop to shake out during a strong wind within a couple of days of the wheat being fit to strip. (6) No grain is lost during the harvesting operations. (7) You are able to work in cool and damp weather. In some countries where this system of harvesting is in force the crop is cut and stacked under cover and threshed when convenient; but this is only when the summer season is a very short one. Our special point in this connection is, however, in the fact that the land is kept clean. Mustard and turnip are, as you all know, completely spoiling some crops, and this is the only system of harvesting which we can at present recommend as being able to cope effectively with the crop and at the same time keep the land clean. A very good thresher can be purchased for less than £200. Many of the present day threshers cost £100. A good

harvester costs a little less than £100. It is safe to say that a thresher will last twice as long as a harvester. We consider that three binders will go over as much ground as two harvesters, and that a binder and harvester will each last 10 years. It will be understood that the length of use of binders is calculated for cutting wheat or other grain crops. Of course, if the machines are used for cutting hay they will not last so long. Admitting that a thresher will last 20 years, a harvester 10 years, and binder 10 years, the figures work out as follows:—

Three binders, £130 1st 10 years	Two harvesters, £200 .. 1st 10 years
Three " 130 2nd 10 "	Two " 200 .. 2nd 10 "
One thresher 200 20 years	
Total ... £460	Total... £400

That means £60 less cost when harvesters are used; but we think that the extra sum required would be amply repaid by advantages gained, viz., not so much grain lost during harvesting operations; the acquisition of a better name for your grain and hay through not having any mustard seed; and other advantages which have been mentioned during the course of the paper. The great disadvantage however, that lies in the use of the thresher is the cost of labor; but, to get over this difficulty, we suggest co-operation among, say, three farmers or more, as the necessity arises. If this were carried out the difficulty would be overcome." In discussing the subject, Mr. Coffey expressed the view that the cost of labor would render impracticable the system recommended in the paper. Co-operation would not be a successful means of overcoming that difficulty in the majority of cases. Messrs. Burton and Steele agreed that there would be too much waste of grain on a hot day in the process of carting, but Mr. Briggs thought that if this occurred it would be due to the fact that the wheat had not been cut early enough. Mr. McAvaney agreed with the paper in the matter of cleaning the land, but thought we would go back to strippers and winnowers in a few years, as a better export sample was procured when these were used. Mr. Stone did not think we would go back to strippers. Harvesters had come to stay in clean districts. For other districts, where turnip, &c., had a good hold, he thought that part of the crop would be harvested and part gathered with the binder and thresher. Other members preferred the complete harvester, some the stripper and winnower, but most of them considered that the threshing would be too expensive.

Spalding, November 15.

PRESENT.—Messrs. E. E. Gill (chair), Work, A. B. Jones, J. H. Pluckrose, T. Walsh, G. Thorn, D. Shane, P. A. Gill, D. A. Campbell (Hon. Sec.).

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. E. Gill, who supplied the following notes for the guidance of members:—"In a district like this, that is totally devoid of natural timber, plantations of useful and ornamental trees are very important. I find the trees that do best are sugar gum, red gum, *pinus insignis*, *pinus maritimus*, pepper, white acacia, white cedar, poplar, and cypress. The ground should be ploughed to a depth of 6in. or 7in., and the planting done early in winter, to get the trees well established before the dry weather sets in. The pines must be securely staked and the gums and peppers protected, with half a super. bag kept out with four sticks, against the frost and strong winds. The bags should be left around the trees until November. If the spring or early summer is dry it is advisable to water the trees, and the ground around each must be loosened up after each heavy rain or watering. This seems a lot of work and trouble, but it will result in 100 per cent. of the trees living. As each tree well established is worth a sovereign, you are well repaid for the work. There are no vacant spaces in my plantations, and the growth of the trees, i.e., 6ft. in one year, 12ft. to 20ft. in three years, and 34ft. in five years, shows that if my system is not the correct one it is one that is fairly good. The hedges around the homestead are useful as break-winds, and some of them are very ornamental. There are six different hedges, planted two years and four months ago, consisting of, in the order of their growth and suitability to the district, African boxthorn, tagosaste, tamarisk (deciduous), *Cupressus Lambertiana horizontalis*, *pittosporum undulatum*, and *Kia* apple. There are also *rhamnus*, *coprosma lucida*, *lauristinas*, *nerium*, and *bougainvilleas*. These are good hedges, but cannot be compared with the others, as they have only been planted 16 months. Climbers around the house which are doing well are *kennedia nigricans*, *bougainvillea*, and *tacsonia*, which are evergreen, and *wisteria*, *Ampolepsis engelmann*, and *Ipomœa Leari*, which are deciduous. It is advisable to plant deciduous climbers near windows so that the foliage will not interfere with the light in the rooms in the winter time. Climbing roses, which make a fine show

and protect each other from the wind and sun, are Dorothy Perkins, Niphetos, Fortuniana, crimson rambler, Banksia, climbing Maman Cochet, Liberty, and Caroline Testout, and McCartney grandiflora. The last named is a magnificent climbing rose. Every homestead should have a patch of green fodder through the summer. This helps the cows and poultry, besides being a beauty spot. I find lucerne far the best and maize next. I have also *Paspalum dilatatum* and veldt grass, but you can see that these are not to be compared with lucerne and maize. The average farmer will tell you that his well water or creek is too salt for a garden, when very likely, if he would try it, he would find that it is all right for irrigation purposes. The water I use, pumped from a running creek, was analysed by the Agricultural Department in February (when the creek was normal) and showed the following analysis, dated February 10th, 1906:—

Total solids in grains per gallon	183.00
Chlorine	88.2
Equivalent amount of common salt in grains per gall. .	145.5
Calcium in grains per gallon	7.5
Magnesium in grains per gallon	10.35
Carbonic acid (CO ₂).....	9.00
Temporary hardness	15°
Permanent hardness	44°
Calcium carbonate	15.00
Magnesium carbonate	nil
Sodium carbonate	nil
Magnesium, sulphate, and chloride	40.2

The officers of the department at that time were of the opinion that the large quantities of magnesium and alkaline salts made it an inferior water, except perhaps for lucerne or plants of a similar hardy nature as regards salt. In fact, one officer told me that it was a water that should be used with caution, unless I pickled meat with it, then I would find it nearly right. The results would be watched with interest as he thought the information derived would be of value to the department. I pump the water with a 3in. centrifugal pump, and the power used is a 10-h.p. Blackstone oil engine. This plant has been running for six years, and millions of gallons of this water have been run over trees, lucerne, maize, sorghum, mangolds, tomatoes, the vegetable garden, and the flower garden, and up to now no signs of deterioration have appeared on any part of the land treated, and enormous crops are still grown. The land is dark loam over a limestone subsoil, the subsoil being from 8in. to 2ft. from the surface; none of it is subject to flooding from rain, except the flower garden, which is flooded after every heavy precipitation. [Mr. Gill has now been asked by the Department of Agriculture to supply a further sample of the water, so that the quantity of alkaline salts may be determined to see whether there is still such a high percentage present as was the case in 1906.—ED.] The engine also supplies the power for the chaffcutter, circular saw, corncrusher, and grindstone; these are all necessary on any well-appointed farm, and with a galvanized iron shed, all can be used in wet weather when it is impossible to work horses on the land. The cost of kerosine and upkeep for the engine is very small. I would also like to point out the usefulness of a good incubator, as it enables a farmer to keep up his supply of young birds, with very little trouble and expense. You will notice a clutch of 132 chickens and 47 ducklings, three weeks old, strong and healthy. They were hatched together in a 200 egg Simplex incubator—a brooder was not used—the ducks having a week's start. I have worked this machine for nine years and it has hatched out thousands of chicks and ducks for my neighbors and myself. The machine stands in a galvanized iron house 8ft. by 10ft. The reason for hatching so late in the season is that the chicks require no artificial heat. The provision of a rainwater supply is also very important. I prefer galvanized iron tanks to underground tanks, as being above ground they do not catch so much dirt and debris, and as all the supply is not in one tank, some of them can be cleaned out at any time. A 2-in. plug soldered into the bottom of each tank facilitates cleaning. A small space must be left in the stand or foundation in which to work the spanner to screw the plug out. I use 2,000-gall. and 3,000-gall. tanks, and where they are situated away from the house I have them connected with 1½in. piping, with a rubber connection between the tank and the piping to overcome expansion troubles in hot weather."

Whyte-Yarcowie, October 19.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. G. F. Jenkins (chair), G. D. and J. R. Mudge, Robinson, J. E. and F. Hunt, McLeod, Lock, A. Mitchell, E. J. and F. Pearce (Hon. Sec.).

HAY.—Mr. E. J. Pearce read the following paper on this subject:—"In this district it has not been the custom to cut much more than enough hay to supply the farm. It will, however, no doubt be found profitable to do more in this line in the future. Last season, for instance, an untimely frost cut and spoiled some crops which, had they been made into hay, would have returned their owners a value equal to that obtained for a similar crop unaffected by frost. In seasons when we have a good growth of straw, it is always wise to cut much more than enough for the current year's requirements. Doubtless the supply in the district will lead to better facilities than exist at present being provided for marketing. The question as to which is the best variety of wheat to grow for hay purposes in this district is one that will be answered differently by different persons. For the past three years I have been experimenting with Le Huguenot, and I have found it a success, as far as length and weight of cut are concerned. It seems to be more hardy than most kinds. It certainly is a heavy weighing variety, and the stock eat it well. Its faults are: It is a difficult matter to get it to grow thick enough on any but the best of soil, it is a bad crop to harvest for seed (and of course it is not suitable for milling), and there is a doubt as to its feeding value, that is, weight for weight in comparison with other varieties. Mr. McEwin, of Jamestown, said his horses failed to do well on it at Pinnaroo. They scoured and fell away. A Belalie farmer, Mr. Jno. Coles, said it was a fine hay wheat; horses liked it and did well on it, the trouble was to get it thick enough. Two or three years ago Mr. Colebatch said they had used it at Roseworthy and had not noticed any ill effects from its use at the College, and a chemical analysis showed it to be richer in food qualities than ordinary wheats. I would not recommend any one to grow this variety in large quantities, but it is worth while to sow a fair portion of the hay land with it. Another good variety grown in this district, and of extra value, on account of its being also a good variety for grain, is Dart's Imperial. A variety not so well known, and perhaps unsuitable for a good part of the district is Bobs. Both these grow a long straw of good color. Le Huguenot should be cut whilst green, as soon as the grain is well formed. With the other varieties I like, for feeding purposes, to have a fair amount of corn in the head. Stock relish it more and less of it satisfies them, but there is the objection that the mice cause trouble. In most districts, since the advent of phosphates the crops very rapidly pass the most favorable stage for cutting, so it is advisable to begin cutting when the crop is on the green side, in order to get through before it is too ripe. In this way it will be found that the hay will average a good quality. I like to bind it in a good large sheaf, but one has to be guided to some extent by the crop and weather conditions. If the hay is very sappy or the weather moist and cool, there is danger of the sheaves not drying through sufficiently. Under these conditions a smaller sheaf is safer. If the ground and weather are dry and warm, it is scarcely possible to stook the hay too soon after the binder, but in doing so care should be taken not to make the stooks too large. I am not in favor of large stooks at any time, as, if we get a fall of rain, as often happens whilst the hay is on the field, it soaks through and fails to dry out quickly enough. I would not build the stooks more than four sheaves in width, two leaning against two, with an air space through the length of the stook. The sheaves should be so laid that when the stack settles down they should slope downwards from the centre to the sides. Then, if care is taken to keep the centre of the stack well filled, there is little danger of a rain of an inch or so doing any harm and making it necessary to throw off a part of the stack to dry. There is also far less likelihood of the stack sustaining damage from winter rains. Stacks should be built east and west. I believe it to be a paying proposition to erect a permanent roof of timber and iron. The waste sustained each year at the top and bottom of the stack would, in less than 10 years, pay for same." In discussing the question, Mr. Robinson said he favored stooking to a width of three sheaves, as the hay then dried much more quickly. Smart's Early was a good hay wheat, and he thought the idea of having an iron roof one well worth consideration. Mr. J. E. Hunt was also of opinion that it would pay to put iron roofs on stacks. He had found that horses did not take well to Le Huguenot wheat if it were fed long, but when chaffed they ate it readily. Mr. G. D. Mudge thought it a good idea to stack the hay on a layer of old posts. This kept the sheaves at the bottom from being damaged. Mr. Mitchell considered a good layer of straw was sufficient cover, especially if it were kept in place with wire netting. Mr. F. H. Lock thought that oats would not pay as a hay feed, but they were of great value when mixed with chaff and used as grain. King's Early was a good wheat, but Smart's Early was not nutritious. He preferred cutting the wheat for hay when the grain was fairly full. Mr. G. F. Jenkins thought Le Huguenot a very good hay wheat and his horses had done well on it. Dart's Imperial was a good hardy wheat. Sheaved barley straw was an excellent foundation on which to build the stack.

Yongala Vale, November 16.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. C. Fowles (chair), T. Battersby, W. Edson, J. and G. Lloyd, E. Fowles, B. Webb, W. Keatley, G. H. Jansen (Hon. Sec.).

HARVESTING.—Mr. E. Fowles read a short paper on this subject. The crop for hay, he said, should be cut as soon as the blossom had disappeared, and it should then be immediately put up in stooks consisting of no more than 15 to 17 sheaves. The best varieties of wheat for hay were, in his opinion, Dart's Imperial and Marshall's. He would not recommend growing oats alone, but mixed with wheat; this would provide a good hay crop. Stacking should be commenced immediately the sheaves were dry, and the stack should be provided with a cover as soon as good straw was available. It was not advisable to put the stacks too close together, nor should they be in proximity to an engine-shed. In building it was advisable to keep the centre well filled up, then if a thunderstorm were experienced little trouble would be encountered. The top should be commenced when the stack had reached a height of 18ft. Reaping should be commenced immediately the crop was ready, whether the hay had been put in or not. Bags should be sewn as soon as possible after reaping, and wherever practicable a tarpaulin could be used on which to stand the bags, and this would save a considerable amount of wheat. Where operations were started too early in the morning it would generally be found that the thresher was much more difficult to work, and in the long run this did not pay.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Balaklava, October 12.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. H. P. Burden (chair), W. J. Gleeson, F. Wagner, R. S. Goldney, G. C. Neville, H. Roberts, J. Spillane, H. L. Twartz, P. Roediger, O. Uppill, B. R. Banyer (Hon. Sec.), and one visitor.

FALLOW.—Mr. Uppill read the following paper:—"Nearly every year we are confronted with some difficulty in working our fallow, with the result that a portion of it does not get the treatment we desire. At some period of the year, either when the spring working should be done, or at seeding time, it is, perhaps, too wet or too dry, consequently it gets in a very dirty condition with all kinds of weeds that are encouraged by the continual use of heavy dressings of superphosphate, and of which it is a very difficult matter to be rid. My experience is that by the ordinary treatment we give our land it is almost impossible to again get it clean from rubbish; in fact, with some kinds of land the working would cost as much as is received for the crop. The difficulty is to get the seeds to germinate. Every time the land is moved a fresh lot will start, and wild oats have been known to stay in the ground for 15 years without germinating. To meet the difficulty I would advise cropping every second year, or adopting a rotation of wheat, fallow, wheat, and so on for a few years, until the land proves to be clean enough for the usual rotation. Each year the stubble should be burned off at the end of the summer, a light implement, such as scarifier harrows in plain land, and a spring-tooth cultivator in rough land, run over the land before rain, and then the harrows applied, to make the top surface fine and dusty. This will give the weeds a chance to start at the most seasonable time of the year. If the weather and land are suitable, a cultivator can be used directly the seed is in and before ploughing. This will help a further germination before any seed is ploughed down. Then the usual course of cultivation after every rain must continue for the rest of the year. With the ordinary three years system of cropping the weed trouble is one of the greatest difficulties. Only particular kinds of land can be ploughed in the autumn, and the plough in any case is the only first means of cultivation, whether then or in the usual time, with the result that the weeds are turned down to the bottom of the ploughing, and the cultivator only brings them to the surface by degrees. How long this theory can be carried on remains to be seen, but I know of two instances where farms have been worked under similar conditions to these for at least six years,

and last season, although an unfavorable one, they produced 22bush. and 25bush. averages respectively. Where a farmer goes in for keeping stock he will certainly feel the loss of a stubble paddock for early feed. A coat of super. could be put over the grass paddocks in the autumn, which would ensure a crop of good quality grass." Mr. Gleeson said the idea would work well enough in a suitable season, but in a season like the present the difficulty was to get the rubbish to grow. Some farmers in his district had gone in for summer working with the cultivator. Last year they had had good results. He thought there was nothing like fallowing early, and working it as the rubbish needed, keeping the fallow as fine as possible. The skim plough was more useful than the cultivator, as it gave a better bottom. He did not think it wise to work the fallow after every rain, especially in windy weather such as had been experienced lately, as there would be a tendency for the soil to drift. Mr. Roediger said the method of working land depended upon the class of soil. He did not think they could work the fallow too fine. He thought the harrows might be used after heavy rains. He had noticed that stubble paddocks fallowed down seem to stand the dry weather better than those standing for three years. Mr. Goldney said the difficulty was that the weeds did not all germinate at the same time. Charlock caused them trouble. He believed wild oats germinated after being in the ground for many years. Mr. Neville said the best crop on his farm was on land that had been burnt off and fallowed for the third time. If land were held over for a couple of years the weeds took all the superphosphate that was left in the ground from the crop. If burning off were adopted the weeds had not the same chance. Scarifier harrows were the best for the purpose of keeping the weeds from getting a good start. Mr. Roberts thought the more the fallow was worked the better. A neighbor of his had harrowed his crop, leaving a strip a chain wide. The difference was very marked. It seemed to prove that harrowing about a week after sowing helped to get rid of weeds. Mr. Spillane thought a good plan was to run the cultivator over the land in March, and then harrow just before sowing, which would get rid of a lot of rubbish. Some of his neighbors had tried continual cultivating, and it seemed to answer, but he did not think that killed the weeds, but worked them up. He thought the land should be worked lighter. Mr. Twartz said ploughing deeply had always been advocated, but his experience was that shallow ploughing was the better under his conditions.

Blyth, November 14.

(Average annual rainfall, 16·28in.)

PRESENT.—Messrs. A. L. McEwin (chair), J. S. McEwin, T. Dunstone, W. Pratt, J. J. Clarke, R. Buzacott, C. Lehmann, W. H. Best, F. T. Pedler, D. Crawford, J. B. and F. A. Kirchner, J. and T. Williams, J. T. Harmer, Dr. A. V. Heynemann, H. W. and W. O. Eime (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. A. L. McEwin. Members inspected the wheat crops. A paddock of 950 acres of Marshall's No. 3 looked very well. It was sown on good fallow with 70lbs. of seed and 1cwt. of super., 38 to 40% soluble phosphate. Penny wheat was not so well headed as the former crop. Sixty acres of Federation were sown on fallow that had not been ploughed; the stubble was cultivated in March and again twice between seeding time and harvest. No difference could be noticed between this and the ordinary fallow. Alongside, a small strip of King's Early looked inferior to the other crops. Silver King and Yandilla King looked best of all, and promised 30bush. per acre. These two varieties were sown on fallow about the middle of April. No rain fell until the end of May, and patches came up before the rain. Federation looked to be the only wheat that had suffered during the dry spell; it was also the thickest. All were sown with the same amount of seed and manure. The horses were next inspected, and they consisted of good draughts. Mr. McEwin owed his success to breeding from young stock and good feeding. The hay shed was admired by several. It held about 200 tons, and Mr. McEwin had just erected a large implement shed of iron, so arranged that he could shelter the sheep in it over night during shearing.

REGISTRATION OF STALLIONS.—In a paper dealing with the proposal embodied in the resolution passed at the last Congress of Agricultural Bureaux, recommending the Government to make provision for the compulsory registration and examination of all stallions travelling for hire, and limiting the number to travel in a district according to the requirements of the district, Mr. J. S. McEwin said—"This is nothing more or less than a tax on stallions, and no matter who pays it in the first place, in the end it is going to revert to those who require the services of the horse, and in nine cases out of ten they will be the men on the land. As the manufacturer has to pay more for his labor or

material he puts the price on the finished article, and such will be the case with the registration. The more expense the owner is put to the higher will he raise the fees. I am perfectly satisfied that the breed of horses in South Australia is improving, and a much better stamp of horse is to be seen on the farms to-day than would have been seen 10 years ago. With the man who has a team of mongrels the main fault is neglect. If they were properly cared for they would look better and do much more work, the more especially if they were properly looked after up till they were four years old. We have proved that horses that have never had a check up till that age are more easily kept after they are put to work, and develop much better. If farmers pay more attention to feeding their horses, and the breeding standard improves at the same pace during the next 10 years as it has in the past, the horses of South Australia will be very creditable. The present form of examination of stallions is sufficient. A man knows whether he is breeding from a sound horse or not, and if the horse has not a certificate of soundness the breeder must run the risk of his foals being sound or not. If only horses that travelled for hire were to be registered we would have more mongrel stallions than before, for this reason, the well-to-do farmer now will only use the best horse he can get, and as a rule the farmer who has just started, and is not so well off, cannot afford to use a high quality horse because his fees will be higher than those of a poorer type of horse. The result will be that he will keep a colt of his own, because he will do the work of an ordinary horse, and there would only be a little extra trouble in looking after him; consequently we would be no better off than before." Mr. Lehmann, who agreed with the remarks made in the paper, said he thought the inauguration of a stud book would tend toward an improvement in the quality of horses. Mr. Buzacott believed in the registration of stallions, even when they were only kept by the farmer for his own use. The Branch took a vote on the subject of registration and the introduction of a stud book, members expressing an opinion in favor of both.

Clare, October 25.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. Menzie (chair), J. Berridge, P. R. Pascoe, F. Keane, F. Pryor, A. Hill, F. W. H. Lee, J. Dux, F. Pink, A. J. Lee, A. Pyecroft, M. L. Nolan, C. P. Jarman, F. W. Hicks, S. Pascoe, C. Scott, R. Stewart, R. Hunter, E. Kelly, W. Taylor, E. Victorsen, J. C. Radford, C. J. Radford, J. H. Knappstein, H. A. Hanna, F. J. Gerteau, and P. H. Knappstein (Hon. Sec.).

WHEAT FOR DISTRICT.—Members were generally agreed that the most suitable wheats for hay in this district were Marshall's No. 3, King's Early, and Smart's Pioneer. Federation and Silver King were the best kinds for grain.

FROST-BITTEN VINES.—It was thought advisable to rub off affected shoots of vines that had been frost-bitten, as this practice gave the bare bud an opportunity to send out another strong shoot.

Friedrichswalde, October 19.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Goodfellow (chair), F. Heintze, R. Marlow, F. W. and E. Duldig, J. Michalaney, Coombe (Hon. Sec.), and three visitors.

CULTIVATION OF FALLOW.—Mr. P. Goodfellow read a paper on this subject as follows:—"The cultivation of fallow is an important item to the up-to-date and successful farmer, but the remarks I make will not apply to all classes of soil and climate. For local conditions I plough immediately after seeding is finished, to a depth of 3in. or 4in., and every second or third cropping to a depth of 5in. As soon as the ploughing is completed the land should be logged. I prefer logging to harrowing, as the surface is made level, and more clods are broken. At the beginning of October the land should be worked with a heavy cultivator to the full depth of the ploughing, and the working should be continued until the whole area is gone over, whether the soil be wet or dry. By cultivating to the full depth of the ploughing the soil is kept open, thus permitting the absorption and retention of more moisture than would otherwise be the case. The influence of the sun in sweetening the soil will also be greater than if the soil is worked shallower. Should any summer weeds appear before harvest it pays handsomely to go over the fallow with a spring tooth cultivator, which implement is sufficiently heavy to destroy the weeds. As soon as the harvest is completed, the land should again be gone over with a ribbed roller, with the object of breaking the clods and levelling the surface. Before drilling is commenced it should be cultivated with a heavy cultivator to a depth of 2in. Each

working should cross the previous one. Fallow treated in this manner will amply repay the farmer for the labor and expense involved, as by the conservation of moisture, the sweetening of the soil by exposure to the sun, and the destruction of weeds, the succeeding crop will benefit immensely." The majority of members favored the harrows in preference to the log immediately after the first ploughing, as although the land was perhaps not made so level, it received an extra working which would be beneficial to the succeeding crop, and the soil would not set so hard in the event of heavy falls of rain. Otherwise members supported the writer of the paper in the various points brought forward.

HAY-MAKING.—A paper dealing with this subject was read by Mr. E. Duldig as follows:—"Hay-making is an important item to the farmer, as so much depends on the feeding of his horses. If he purposes cutting more than the requirements of his own stock it is advisable for him to start a little earlier than he otherwise would. For feeding hay should be cut as soon as the grain is properly formed, it will then contain sap as well as grain. If cutting a considerable amount it will be necessary to commence before the 'flower' leaves the wheat. For sale purposes, the hay should be cut still greener, to get as much sap as possible. This will give the chaff a nice green appearance, and it will sell more readily than hay cut later, although the latter will weigh better. Immediately after the hay is cut put it into stooks of about 20 sheaves each, placed upright, with the outer ones leaning to the centre. This forms a roof to the stook, and little damage will be done should rain fall. By making small stooks the hay can be carted sooner than if larger ones are made. Ten days should elapse before carting is commenced, as then the hay will not be too dry, nor will there be any risk of it going mouldy in the stack. The stack should be built east and west: heavy westerly storms will then only beat on one end of it. The foundation should be level all round the edge, with the centre at least 2ft. higher. This will give a slope to run off any water. It is advisable to build only one sheaf high all round the stack, and then there is little likelihood of it slipping. round ends are the best, and the dimensions should be in the proportion of at least 3yds. long to 1yd. wide. If the stack is to remain intact for any length of time it should be thatched and made mouse-proof by cutting sheets of iron lengthways and putting them 3in. in the ground close to the stack."

Friedrichswalde, November 16.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Goodfellow (chair), J. and F. Heintze, F. W. Schutz, F. W. Duldig, R. Marlow, A. G. Reichelt, G. Grope, and Coombe (Hon. Sec.), and seven visitors.

HARVESTER v. STRIPPER.—F. W. Duldig read a paper supporting the use of the complete harvester, as follows:—"In all professions and trades at the present time the most up-to-date machinery is being used, and it behoves the farmer to be in line. He must have a complete harvester, so that he can take off his own crop without encountering labor difficulties, and in less time than is required with an ordinary stripper and winnower. With a complete harvester weight of wheat is gained and wages saved. A contract might be let for sewing at the rate of 1d. per bag. This would be a good deal cheaper than gathering the crop with the stripper and paying 5d. or 6d. per bag to have it cleaned. With a harvester it is possible to start a little earlier in the morning, and also to work in cooler weather than with other reaping machinery. I have harvested over 100 acres with a harvester in the same time that it has taken my neighbor to strip 30 acres with a stripper, on account of cool weather. With a harvester there is a better chance of securing an early market for the wheat. It is not advisable to start stripping before the wheat is properly ripe, although I have done so and secured good returns. The cocky chaff can be saved by a carrier attached to the machine. Chaff saved in this manner is free from dirt and sand, which are the causes of more sickness in horses than is usually recognized. The farmer using the harvester should cut sufficient hay to see him through the year; but if there is likely to be a shortage a good idea is to cut some good wheaten straw and chaff this with the hay. The waste of wheat with a harvester is no greater than that with the stripper. Amongst other faults the harvester is credited with is its tendency to distribute seeds of weeds over the soil, but as a rule the seeds are on the land before the wheat is harvested, and by adopting a proper system of fallowing and cultivation the farmer should have very few weeds with which to contend." Mr. F. W. Schutz gave a paper to the following effect:—"It would be interesting to know the number of strippers and harvesters in use in the State. Both machines apparently have a lot to recommend them. Under certain conditions the harvester is perhaps the better machine, but this district does not provide the necessary conditions; in fact, very few districts in the State do. In the first place the hilly nature of the local land favors the use of the stripper, as, however capable the person in charge of the harvester may be, he will be unable to

prevent loss of grain and obtain an even sample. When the harvester is going uphill the fans, and in fact all the mechanism, are of necessity working slower than if the land were level, and this permits a good deal of rubbish to work through the sieves into the wheat box. When descending a hill the pace is increased in all parts of the machine, and wheat is consequently thrown over the tail with the chaff. When using a hand winnower for any purpose it is necessary to see that the machine is standing level, that the handles are turned regularly, and the machine is fed regularly. If it is necessary to do this with a stationary winnower it is surely equally so on the harvester-winnower. Then there is the saving of horseflesh, in itself an important item; but more important still is the saving of horse feed, in the shape of cocky chaff. The value of this cannot be overestimated, as mixed with pollard or bran and corn it makes a capital feed for stock, and can be made to take the place of hay chaff without any detrimental effects. The value of this feed will be realised when the price of hay rises. The harvester is certainly old when it has worked 10 seasons, although there are exceptional cases: but a stripper is in its prime after 30 seasons' work. Of course, a winnower has to be purchased, but after the first outlay the expense is so small that it need not be considered at all, and apparently winnowers never wear out. The stripper and winnower, costing about £75, last three times as long as the harvester, costing £85. Owing to the additional mechanism and complications on the harvester the breakages and delays are numerous, whereas the stripper will work year after year with absolutely no delays from this cause. Delays are sometimes very expensive, as two or three days are lost in obtaining new parts. One or two bad seasons will see the stripper more in evidence, while the harvester will be used to supply the rest of farm implements with bolts, nuts, &c." A lengthy and thorough discussion followed, and on a vote being taken a majority of one supported the harvester.

Greenock, October 26.

PRESENT.—Messrs. J. Jungfer, A. Nitschke, W. F. Nitschke, H. Koch, O. Semmler, E. Geyer, W. Roenfeldt, E. Roenfeldt, Aug. Heinze (chair), V. Koschade (Hon. Sec.)

FALLOW.—Mr. Aug. Heinze read the following paper:—"The method of farming practised now is vastly different from that of 25 or 30 years ago, and the farming community is greatly indebted to such men as Professor Lowrie, our present Director of Agriculture, and Mr. Molineux, who did so much in the direction of introducing scientific methods of farming, which have now become general. Fallowing was carried on by some of our practical men even 20 years ago, but the ploughing was always done late in the season and not started until winter was over, and the land was ploughed in a dry state, thus there was no moisture conserved in the soil. It is absolutely necessary that fallowing should be started as early as possible in autumn, in fact as soon as possible after seeding is completed, and be finished before the winter rains have ceased, in order to get as much water as possible down into the soil. The depth of ploughing naturally depends much on the nature of the soil, and in our district I consider 4in. to 5in. quite deep enough for the first ploughing. A plough cutting a 7in. furrow is certainly preferable to one cutting a 9in. furrow, and a five-furrow plough cutting a 7½in. furrow is drawn more easily by the same team of horses than a four-furrow cutting 9in. The 7½in. furrow implement will certainly give much better results. After the ploughing the land should be cross-harrowed to break the sod; this at the same time will cause weeds to germinate and grow all the quicker. After the cultivator has been over it the land should again be harrowed. If fallow is allowed to remain unworked and to harden, moisture is lost from the soil by capillary action and evaporation. If it is continually worked, only shallow working is advisable. I prefer ploughing to scarifying, because weeds, which in all probability will and should grow, are turned under and add humus to the soil."

Nantawarra, November 21.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. R. P. Uphill (chair), S. Sleep, E. J. Herbert, A. F. Herbert, J. Nicholls, R. D. Nicholls, J. Sinclair, W. Smith, W. Greenshields, F. J. Sutton, and G. L. Tucker (Hon. Sec.).

SOCIAL LIFE ON THE FARM.—Mr. W. Smith read the following paper:—"Farm life should be full of the spirit of pleasure. Such an attitude toward one another of individual families and neighbors animates the social instinct, disperses worry, and sharpens the senses; but such cannot be expected where begrudged trips to town and infrequent

outings are the rule. The faculties and emotions, which are necessarily dulled by monotonous routine, physical toil, and inactivity, require cultivation in order to make them responsive. Play is indispensable to man and beast. Farm life can be expanded and mellowed by the play and freedom which out-of-door recreations yield. Why not enjoy them before work, worry, and age deprive us of the capacity of spirited, joyful living? Children are all more or less destined to receive erroneous ideas in regard to pleasure. Some of them have it knocked out of them by uncomprehensive seniors until they, in turn, bring up their offspring in righteous scorn of what is known as enjoyment. A few of them, however, soon arrive at a rebellious state of mind toward restraints for which they can find no logical justification. Such as these grow up to take their dessert with splendid defiance, whenever it most pleases them. They are the people who have kept their souls alive, and who understand happiness. Many a woman on the farm has become accustomed to going through life without any prospect of desert. Her isolation and overwork have tended to produce in her a quiet submissiveness to conditions which allow of no time for spontaneous happiness. Yet the woman's happiness on the farm is one of the great essentials to rural progress; therefore, let the farmer husband look to it that his wife is afforded time, energy, and health for happiness, and let neither of them be so busy getting ready to live that they never have time really to begin. As soon as the farmer realizes that the stock on the place and the products of the farm are not the only things to understand, and that he cannot be successful unless his wife is made sufficiently comfortable and contented to want to stay there, he will take steps to conserve her energies that she will have more time to make herself really more companionable to him. Among the more valuable appliances recently brought within reach of farmers' wives is some variety of oil engine, also water motors. These engines will pump water for all domestic purposes, and can be used to operate the separator and churn, and even the washing machine. Improvements such as these are within the reach of almost every modern farmer, and they will be a more practical help in solving his domestic perplexities than he may at first realise. In this way he will find that all the members of his household have greater and better health wherewith to enjoy life. There is also a great deal of pleasure to be had by allowing the young members of the family to invite their companions to the home, where, with the aid of a musical instrument, such as a piano or organ, they can indulge in music and singing, and spend many happy hours in this way, to the benefit of all that are present in the home. The more we try to advance the social, happy life in our homes and on our farms, the more chance we have of keeping the members of our families with us, and they in turn will take a greater interest in the farm life of which they form a part." Mr. E. J. Herbert entirely agreed with Mr. Smith's views on the subject. A farmer's wife often spent a life of drudgery, but there was no necessity for it. One matter, however, that he had noticed was not dealt with in the paper. Many farmers had very comfortable homes, nicely furnished, &c., but in his opinion not enough attention was given to the kitchen, in which the housewife spent so much of her time. The kitchen should be as well fitted and ventilated as any room in the house. Mr. Sleep said a great many farmers had an ambition to make a competence and then retire to town life. Country life could be made very comfortable and enjoyable if only people went the right way about it. Mr. R. D. Nicholls thought there was a tendency among the young people on the farms to-day to spend no time in amusement and recreation. In the early days the old pioneers of the district, while working harder, still had more enjoyable times than the present generation of young people. Farm life tended to muscular development, and fine physique was often found among the young men on the farms, but very little culture. In his opinion, as farm life developed the physique, so social intercourse tended to develop the mind.

Salisbury, November 5.

PRESENT.—Messrs. Moss (chair), McNicol, Tate, Frost, James, Shepherdson, Hooper Short, Urlwin, T. Judd, Neal, Powell, Hooper, and Jenkins.

THE BREEDING OF LAMBS FOR MARKET, &c.—The paper on this subject which appeared on page 297 of the October issue was read. In discussing the matter, Mr. Neal said crossbred ewes were much hardier than the Merinos; they also produced better lambs for freezing. Mr. Frost had sown oats and barley without manure early in the season, it had yielded good feed, and he now intended cutting half the remainder for hay and stripping the other half. Mr. Patterson believed in cutting the farm into small paddocks, and always allowed the feed to obtain a good start before he put stock on it. For sowing early feed in this district it was necessary to have early rains to enable the ground to be worked.

Mr. Moss advocated heavier manuring. Mr. McNicol mentioned a case where a 40-acre block had last season been put under peas with the exception of a small strip, which had carried oats. Six hundred wethers were put on the crop, and they cleaned it out. During May of this year, the paddock was ploughed up and sown with King's Early wheat. The wheat was now showing an excellent crop, and that portion of it on the area which had previously been under peas was somewhat better than that on the land on which oats were grown.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Moonta, November 11.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. W. B. Stacey (chair), C. H., and E. Nankivell, T. R. Luke, J. Bowden, H. Fuss, P. Ford, A. B. Fergusson, L. Howlett, W. F. Ortloff, T. Laidlaw (Hon. Sec.), and two visitors.

HAYMAKING.—Mr. C. Nankivell read the following paper:—"Haymaking is one of the most important operations connected with farming, as it is concerned with the preserving of food for the sustenance of the stock throughout the year. The primary essential is to cut and preserve it to conserve the most nutriment. It should not be cut too green, or it is likely to have a scouring action on livestock. The highest quality will be secured if it is cut when the grain is of full size but still in the milky stage. Ears, stalk, and flag will then prove equally nutritious, and if properly cured the chaff will show a nice green color and possess a small quantity of shrivelled grain, which are the usual commercial standards. If the crop is allowed to over ripen the nourishment goes into the head. It is better for the stock that this should be distributed throughout the plant. I believe in close mowing. When binding, the twine should be kept fairly well down and tied as tightly as possible. This makes the sheaves better to handle and means a saving in labor. I believe in stooking as soon as the crop is cut, in small stooks, which should be left for from 10 to 14 days before stacking. The best hay wheats are Marshall's No. 3, Gluyas, and Baroota Wonder." Mr. A. B. Fergusson believed in cutting his cleanest and best crop for hay. Many farmers cut dirty and selfsown crops, thereby spreading weeds over their land. He preferred King's Early wheat and Cape oats mixed—1 bush. of oats crossdrilled with three-quarters of a bushel of wheat and 50lbs. of super. both ways. The Cape oats were sweeter than Algerian. The hay should lie for between half a day and a day before being put into small stooks, it would then be ready for carting sooner. If hay were cut on the green side horses were more likely to scour if it were fed to them when it was new. Mr. W. B. Stacey believed in cutting wheaten hay shortly after the flower had dropped, and stooking directly after it was cut. All the sap was retained in the stalk, and better color chaff, which commanded a higher price than that cut when the wheat was full, was secured. Oats should be left until nearly ripe. Members preferred King's Early, Marshall's No. 3, and Gluyas to Le Huguenot and similar wheats for hay. Mr. Brinkworth had drilled in 50lbs. of guano before fallowing. He considered that the manure when worked with the soil would be thoroughly mixed, and when sowing he would drill from 50lbs. to 75lbs. more of manure. He tried this last year and the crop promised to be the best he had had. He also drilled in some wheat as late as August for greenfeed, and tabled plants 18in. long just out in ear. He generally has greenfeed until the end of the year. Mr. W. F. Ortloff sowed field peas, and believed they were better than oats for the land. They were preferable for fattening lambs, and were useful in stopping the drift on sandhills. Members preferred oats to peas unless on small holdings.

WESTERN DISTRICT.

Coorable, September 28.

PRESENT.—Messrs. A. W. Hardy (chair), Giles, Riddle, W. H. Wheadon, Atkins, Stott, C. Wheadon, Murray, Woodforde, Roberts, Basnett, Underwood, Jackson, Coppins, Gregory, C. Hobbs, Attick, Weston, Cousins, Iles, H. V. Hobbs (Hon. Sec.), and 11 visitors.

ANNUAL CONGRESS.—The following extracts are taken from the report of the Hon. Secretary on the Annual Congress:—"The remarks of Professor Perkins were particularly applicable to the Lower North, but I am convinced that Six-row or Cape barley can be grown relatively successfully here. On inquiry I learnt from some of the West Coast delegates that they find barley stubble very good to burn, it grows thickly and is easily trampled down; this is a consideration with many who are anxious to start fallowing, but desire to get the majority of the roots killed first. Mr. Quinn kindly told me that the fruits most likely to grow here are the almond, peach, nectarine, fig, grape, and pear, and possibly the Japanese plum. He advised grafting peaches on to almond stocks to get better results. We all know that the almond does well here, it does not object to the superabundance of lime in our soil to the extent some fruits will, it also likes thorough drainage, and that our limestone subsoil naturally affords. The Agricultural Bureau is now going ahead by leaps and bounds, and it will continue to do so now that farmers all over the State are seeing the advantage of belonging to such an excellent institution. There are about 140 Branches and over 3,000 members. Farmers have everything to gain by becoming members. It is a great co-operative force by which every member, if he is at all wide awake, helps himself, his fellow member, and his State. It forms a kind of continuation school for the farmer. Through our Agricultural Bureau we are brought in touch with experts and scientific men in every department of the agricultural and horticultural world, in veterinary and every other science that can be of service to the farmer. Any matter that puzzles a member or proves a stumbling-block to him in his daily round on the farm should be brought forward at the meetings and discussed, and, if necessary, an expert reply can be obtained on the subject for that member. There is no limit to the variety of experiments which we could undertake. We should all like to know exactly the relative value of light and heavy dressings of manure, light and heavy sowings of seed, of early and late fallow, of summer ploughing, of harrowing the growing crops, &c., &c., and all these things can be solved with very little trouble if we will all do a share. I would suggest that we appoint an experiment committee and obtain a book in which to keep a careful record of all tests. We should keep a watchful eye for diseases among stock and pests, and report same at once. By doing this we may be the means of preventing great loss among our stock and crops by nipping in the bud some contagious disease. Where there is a strong Branch of the Bureau there will be found the most progressive and successful agriculturists." All agreed that the plan of saving a stack or two of straw to use as feed, was a good one. The Chairman said he thought that perhaps salt would be better than molasses in the straw stack for inland districts, but in a district such as ours, near the sea coast, and where the herbage seemed naturally salty, he would prefer molasses. Most of those present were of the same opinion. Mr. Atkins had tried growing Cape barley, but without much success. Mr. Stott had both Cape and English malting barley growing on his farm and present appearances were in favor of the latter. It certainly seemed earlier than the Cape or Six-row variety. The Chairman's opinion was that the quality of barley grown in this district would not be good enough to command a payable price.

Coorable, October 26.

PRESENT.—Messrs. Kinsley (chair), Wheadon, Riddle, Gregory, Jackson, Murray, C. Hobbs, Grimes, Evans, Fox, H. Hobbs (Hon. Sec.), and one visitor.

SEASON'S PROSPECTS.—The prospects of the season were discussed by members. The general opinion was that crops this year would be below the average, owing to a deficient rainfall since seeding, hot winds in the spring, and in some parts of the district a plague of grasshoppers and numerous rabbits. It was anticipated that yields would be at least one-third less than last year. Roughly estimated, there was an increased area under crop to the extent of 1,500 acres over the previous year, for which the hundred of Wokata was entirely responsible.

HAY-MAKING.—Mr. Riddle contributed a paper as follows:—"Wheat intended for hay should be sown early and consist of an early variety, otherwise the farmer has not

got his hay carted before it is time to start stripping wheat. Fallow land usually gives a heavier cut of hay, just as it gives the highest yield of wheat. Different varieties of wheat suit different districts, and for this district the best hay wheat is Smart's Early, or Clubhead if for home use; but for sale purposes I like King's Early or Huguenot, as the latter grows tall and weighs well. I advise sowing 1 bush. or 1½ bush. of seed, with 60 lbs. or 70 lbs. of super. per acre. The best results are obtained by cross-drilling, using half the amount of super. and seed each way. The right time to cut wheaten hay is about a week after the flower falls; the greater part of the straw is then still green, and there is a fair amount of grain in the head. Hay should always be cut with the binder, as it is much better for handling and chaffing, and there is less waste. Stook the sheaves directly they are cut—this preserves the color. Stooks should be made four sheaves wide; in this way they are not so likely to be damaged by rain as is the case with big round stooks. Hay cut in hot, dry weather should be left in the stook for about 12 to 14 days; in cool, damp weather longer. A lot of hay has been spoilt in this district simply through being carted too soon. For the bottom of the stack I recommend large stones, or failing these, timber. In stacking, the sheaves should be placed with the butts outwards, taking care to keep the middle of the stack about 2 ft. higher than the sides. I believe in doing all the stacking by hand; the same with stooking. Some build the outside rows by hand and fill in the middle with the fork, but if this is done the stack does not settle down evenly, for hand-stacking results in a much firmer stack. Stacks should always be thatched to keep out the weather, and straw is best for this purpose. The little time and trouble will save a lot of hay. Sheaved straw is much better than loose, rough straw. The straw should first be wet in the sheaves and then have the bands cut. Start at the outside and lay a thickness of about 4 in. of straw, thrust thin sticks about 3 ft. long into the roof of the stack about 18 in. apart, taking care that the sticks point slightly upwards; run binder twine from stick to stick, taking a half-hitch around each. Then put on another layer of straw, with a good lap over the first layer; another row of sticks and twine, and so on to the top of the stack. I have never had a sheaf of hay spoiled in the stack when thatched in this way." In reply to questions, Mr. Riddle further said that when sowing wheat and oats mixed for hay a late variety of wheat should be used, and Cape oats put in in preference to Algerian, as the former seemed a little earlier. Oats should not be cut green for hay. Huguenot wheat was, in his opinion, too hard and stiff for good horse feed, and to get a fair crop it seemed necessary to sow at least 1½ bush. to the acre. Clubhead made a hay very acceptable to horses, and they did well on it. He did not think that a heavier dressing of super. would affect the quality of the hay. Leaving it too long before cutting meant losing most of the nutriment of the straw. Long, narrow stooks were more convenient when carting. He recommended, in a season such as this, any farmer who had a good length of stubble after stripping, to cut the straw with the binder and chaff it for feed; but cut it directly after stripping if possible. Musty sheaves, if fed at all, should first be thoroughly dried in the sun and well shaken before being given to stock. Some members favored Marshall's No. 3 for hay, although it was considered a bit too late for this district. White Tuscan did not seem to be a success. Members thought that it required a heavier rainfall. Mr. Kinsley believed that a lot of musty hay was due to the practice of starting the binder too early in the morning and working late at night, when the crop was wet with dew. Mention was made of one hay crop growing in the district that showed very great benefit from an application of stable manure to the land.

Elbow Hill, October 26.

PRESENT.—Messrs. Cooper (chair), E. Wake, A. Chilman, P. Wake, H. Wheeler, H. Wake, C. E. Jacobs, E. Story, F. Wheeler, G. F. Wake (Hon Sec.), and three visitors.

REGISTRATION OF STALLIONS.—Considerable discussion took place on this subject. Mr. Chilman expressed the view that the introduction of a scheme for the compulsory registration of stallions hired for service would be detrimental to the interests of the farmer who bred horses. Horse owners would demand a high fee for service, which would prevent the man of limited means breeding from his mares. He believed it to be advisable to empower veterinary surgeons to reject horses on account of size as well as unsoundness. Members generally were in accord with this view.

Green Patch, October 21.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. F. Gore (chair), E. M. Sage, C. Parker, G. Merchant, T. Freeman, J. Sinclair, sen., J. Sinclair, jun., G. Sinclair, H. Schwordt, A. Murray, C. J. Whillas (Hon. Sec.).

RABBIT DESTRUCTION.—Mr. G. Sinclair read a paper on this subject, in which he stated that in his opinion the cheapest method of getting rid of this pest was to use S.A.P. and pollard. A quarter of a teaspoonful of strychnine sprinkled on to a pint of wheat, which had previously been damped with water, could be placed in a plough furrow, and would be found very satisfactory bait. Dry flour could be sprinkled on to the grain to prevent it sticking together. Where there were a number of burrows a good plan was to drive in the rabbits with the aid of dogs, and place a piece of bagging saturated with water and containing a piece of calcium carbide into the openings, which should then be blocked up. In discussing the subject Mr. Freeman stated that as a result of 19 years' experience he considered pollard and S.A.P., with treacle added, used in a poison cart, the best means of checking the pest. Farmers would have been driven off the West Coast if it had not been for the poison cart. He had tried other poisons, but found the rabbits took the phosphorised pollard the best. He considered that the unoccupied blocks in the district were the main cause of the rabbits being so difficult to deal with, and thought the Vermin Board should do more towards forcing the blockers to destroy the vermin. Members generally agreed with Mr. Freeman on this point. Mr. McFarlane stated that in Victoria the rabbit inspectors had the power, after having given the land-owners ample notice, of putting on men at 8s. per day to destroy the rabbits and charging the owner with cost of same. He thought the South Australian Act should be amended on the same lines. The farmers in this district were doing their utmost to destroy the rabbits, but they were surrounded by unoccupied blocks, upon which practically nothing was being done. Mr. Sage considered 1½ bush. of pollard, ½ bush. of bran, and one tin S.A.P. the best mixture for poisoning, while Mr. Parker favored Gisko. The Hon. Secretary stated that if the Vermin Board enforced simultaneous poisoning throughout the district to the extent of at least 1 bush. of phosphorised pollard each month per square mile for the months of February, March, and April there would then be few rabbits left to do serious damage. He considered S.A.P. too expensive for poisoning to any extent, and thought it better to buy the pure phosphorus. In winter he dogged the rabbits, dug out holes, and fumigated with carbon bisulphide. He found that they took the poison most freely if it were put out after the first rain at the end of the summer. He considered net fences of little use in districts where there was much running water. Both Mr. Sage and Mr. McFarlane had positive proof of rabbits jumping 42in. netting, and all members knew of their jumping 36in. netting. It was generally considered that the rabbits would take the pollard better when sour than when fresh mixed, and that they would take it most readily in the spring after a dry spell.

Green Patch, November 1.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. F. Gore (chairman), A. Porter, G. Merchant, R. Chapman, E. Chapman, J. Sinclair, sen., G. Sinclair, C. Venning, T. Freeman, S. Bailey, T. Murray, D. Murray, C. Dordward, H. Hill, M. McFarlane, C. Parker, C. J. Whillas (Hon. Sec.), and two visitors.

THISTLES.—Mr. R. Chapman tabled a specimen of a thistle which he and some of his neighbors considered should be gazetted a noxious weed. Several members stated that this was plentiful in the hills between Port Lincoln and Tumby Bay, and was considered a fair sheep fodder. It was resolved that the Secretary forward a specimen to the Department of Agriculture for identification.

BERSEEM.—Mr. Porter tabled a splendid bunch of berseem 2ft. 6in. in height. He put in eight acres about the end of last April. Of this the rabbits destroyed seven and a half acres, but he succeeded in keeping them out of a half-acre piece, situated on a deep well-drained black soil flat. This had been ploughed and harrowed, and the seed drilled in at the rate of 20lbs., together with 1cwt. of bone super., per acre. He had already taken three cuts, the half acre producing 7 tons of green feed. It was now ready for the fourth cut, and was a thick, heavy crop 2ft. 6in. in height.

FODDER PLANT.—Mr. Parker reported that he had been trying a new fodder plant, (*Blitum capitatum*), which he thought would be useful in the district. He sowed

some seed in September, 1911. This had grown well through the summer, and was spreading rapidly on his cultivated ground. The plant grew about 2ft. high and stock ate it readily.

COWS GOING BLIND.—Mr. Porter and Mr. Parker each had just lately one cow of their dairy herd go blind suddenly. Messrs. Chapman and Sinclair stated that this complaint had been common with cows in this district for the past 20 years. It did not affect steers. [This trouble was mentioned to the Veterinary Lecturer, Mr. F. E. Place, M.R.C.V.S., B.V.Sc., who states that the blindness referred to is very much akin to some forms of "coasting," and is due to the blood supplied to the eye being very defective in nutriment. It is equally common in working bullocks. Steers feeding only escape as they obtain the essential elements in the food which are not sufficiently plentiful for cows in calf or in milk, or working cattle. As treatment I would recommend bonemeal and salt licks for the cows, and in the two cases mentioned I would dose them with a dram of sulphate of iron and the same quantity of powdered nux vomica, and half a dram of sulphate of quinine in a little molasses and water twice a day for a week, having previously taken two quarts of blood from the jugular vein only once. Bran and oilcake in the feed will also do good.—ED.]

INSPECTION OF CROPS.—Members inspected Mr. Freeman's kale crop, consisting of an area of 70 acres, half put in last autumn and half this. The crop was doing well, and had provided splendid grazing. Members were of the opinion that Mr. Freeman had proved kale to be the most valuable fodder plant tried in the district for the average soil, and many members intend sowing it extensively next year.

Miltalle, October 26.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. E. P. Smith (chair), W. G. Smith, J. P., J. W., and E. Story, P. G. Wilson, F. F. Alm, C. E. Searle, A. M. and M. H. Wilson, F. Jacobs, H. R. Jacobs, W. E. Hier (Hon. Sec.), and five visitors.

DESTRUCTION OF RABBITS.—Mr. F. Jacobs initiated a discussion on this subject, in the course of which he stated that he had tried many different way of combating this pest, and had come to the conclusion that trapping was best. Poison could be laid when feed was scarce, but it was a mistake to think that this was all that was necessary, as only a small percentage of the rabbits would be killed in this way. The Chairman advocated united action, and thought that the Vermin Act should be strictly enforced. It was decided to draw up a petition requesting the Vermin Board to take steps in this direction.

Petina, October 19.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. W. Penna (chair), D. T. Kenny, A. Kenny, H. Doley, J. H. Wharf, W. G. Lewis, E. Keeley, P. Barnes, O. J. Howard, (Acting Hon. Sec.) and three visitors.

FARM MANAGEMENT.—In a paper on this subject, Mr. D. T. Kenny deprecated a tendency on the part of a large number of farmers in the outlying districts to spend too much time in recreation, and he attributed a number of the failures to this factor.

PLOUGHING.—A good discussion took place on this subject. Mr. Kenny had fallowed a paddock and had turned part of it back on account of the appearance of a weed. The crop on this particular part was very backward. Mr. Wharf had ploughed part of his land twice, and the crop on this was much better than that on the other land. Mr. O'Grady expressed the view that fallowing should be finished before August, and Mr. Wharf considered that on sandy land shallow ploughing tended to prevent drift. Mr. Keeley would commence fallowing as soon as seeding was finished, and plough to a depth of 3 in.

Utera Plains, October 26.

(Average annual rainfall, 14 in.)

PRESENT.—Messrs. P. Sinclair (chair), A. Venning, A. Ramsey, W. Gale, W. Stephens, J. and M. Abbrook, F. Braunack, N. Guidera, W. Lee, G. C. Bilney, H. T., T. C., and H. G. Hornhardt, H. D. Rule, F. H. Haywood, R. Hill (Hon. Sec.), and eight visitors.

CONSERVATION OF FODDER.—The Hon. Secretary read the following paper:—"Farmers

should, while seasons are good, make provision for dry spells. This can be done by stripping the crop and saving the cocky chaff, making straw stacks, &c. During the last period of good seasons, a large percentage of the farmers conserved no surplus feed whatever. The majority of those who used the motor winnowers were no better off than those who used the harvesters. It is at this point that we can see how neglectful we have been. I recommend the header when seasons are good. For the use of this machine the crop should be of a fair length, say 3ft. In a district like this, where the stumps are so bad, farmers can be excused for not putting the binder over any more ground than is absolutely necessary, but it is easy enough for a farmer to cut from 50 to 100 acres every second or third year for heading, according to the quantity of stock kept. The crop intended for this purpose should be cut about a week or 10 days before it is fit for reaping, and it should be tied as close to the butts as possible. It can then be stacked and headed at the farmer's convenience. I prefer the headed straw to straw that is raked up and stacked, as headed straw can be chaffed for the stock without the danger of sticks going through the chaffcutter." A keen discussion followed. Mr. W. Gale said that although he used the motor winnower he preferred the cocky chaff from the hand winnower, as the motor machine threshed the heads and blew the backbones into the chaff—the stock did not care for these. He generally agreed with the writer. Mr. A. Venning thought farmers should pay more attention to the combs of their machines. The use of the header was a good plan, especially when the farmer had his own engine. Mr. Searle (a visitor) was strongly opposed to the use of the harvester, as it wasted all the cocky chaff, and there appeared to him to be several weak points in the machine. Mr. Ramsey said farmers should remember the struggles they encountered during previous dry spells, and that would be sufficient to induce them to gather a portion of their straw each year, no matter how rough the stumps were.

Yadnarie, October 26.

PRESENT.—Messrs. W. L. Brown (chair), J. and F. W. Dreckow, E. C. Kruger, F. W. Jericho, R. H. Parbes, R. B. Deer, C. W. Mowat, B. B. Crosby, S. H. Pearce, A. Preiss. J. J. Deer (Hon. Sec.), and four visitors.

DAM-SINKING.—In a short paper Mr. J. Dreckow said careful attention should be given the selection of a site for a dam, as it was necessary that a good clay bottom should be obtained, or the dam would not hold. Drains should be made according to the body of water they were required to carry, but if they were given a fall of more than 3in. or 4in. to the chain there was a danger of creeks being washed out. If the dam were situated in close proximity to the stables care should be exercised in order to prevent the drainage therefrom soaking into the dam. Wherever practicable it was advisable to draw the water with a pump, in preference to allowing the stock direct access to the water. Members generally agreed with this idea, but thought it unnecessary to grade drains for a small dam. More water would be caught where the fall was greater than that advocated by the writer of the paper.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Monteilth, October 26.

PRESENT.—Messrs. Travers (chair), J. Rowan, J. Rowan, jun., D. McDonald, Wells, Carter, P. Gregory, W. G. Gunn, J. Connell, T. R. Smith, R. G. Major, J. Redding, J. Fletcher, W. J. McCulloch, S. Smith, H. G. Gardner, E. Eldridge, G. Fraser, M. McAuliffe, J. Ferries (Hon. Sec.), and 50 visitors.

IRRIGATION.—The Director of Irrigation (Mr. S. McIntosh) gave an instructive address on this subject. He advocated the perennial system as was practised on the reclaimed Murray swamps, and strongly condemned the basin system of irrigation.

Monarto South. November 21.

PRESENT.—Messrs. G. Patterson (chair), R. E. Anders, A. P. Braendler, J. and H. Frahn, G. Gogol, B. Hoff, H. Hein, A. Harper, G. G. H. Paech, A. Schenscher, F. C. Thiele, E. Tilbrook, J. Daly, C. H. Zeunert, C. F. Altmann (Hon. Sec.), and one visitor.

PEAS.—In a short paper on this subject Mr. Harper stated that while peas were more successfully grown in a cooler climate, it was possible if the land were carefully cleaned, to secure good crops in this district. It was advisable to sow in May, as although there was more likelihood of trouble from frosts the grubs would be less troublesome, the straw of the plants was not so long, and the peas harder. A bushel and a half of seed should be put in together with 2lbs. or 3lbs. of oats or other crop to hold the peas against the wind. When stumpy or rough land was being sown with clean seed it was advisable to put a little cocky chaff with it, as the peas would set down tightly in the drill, and the distributors would not work properly. The crop should be cut before it ripened, and cocking should be done immediately. Peas sown on sand should not be put in until the last week in July or up till the second week in August, 5lbs. of oats and 5lbs. of bonedust or super. being added. Larger dressings of manure would result in the crop being too tender and likely to suffer from hot winds. Members agreed that while this district was not suitable for pea-growing, this crop might pay indirectly by putting the land in better heart. Harvesting would not pay, the best practice being to feed off the crop with sheep.

Morgan. October 26.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), J. T. Hempel, E. Hausler, R. Wohling, jun., E. Gilgen, O. Hausler, J. Heppner, I. Pope, H. Wohling (Hon. Sec.), and one visitor.

IRRIGATION.—In a short paper on this subject, Mr. E. Gilgen expressed the view that every farmer on the river should have a pumping plant. Three or four square chains of lucerne irrigated with sprinklers, would provide green feed for two cows right through the summer months. A windmill which he had put in had more than paid for itself in one year, in the way of extra return of feed for pigs, horses, and cows.

HAY-HARVESTING.—Mr. O. Hausler contributed a paper dealing with this subject. Land on which hay was to be grown, he said, should be carefully cleared of all sticks and rubbish, which would cause a great deal of trouble in the mower or binder if they were left. Marshall's No. 3 was a suitable variety for hay in this district, Steinwedel was good, but Federation had a tendency to develop a very white straw if left standing too long. Le Huguenot and Indian Runner were preferred by some, and these should be cut just as the bloom had fallen. Wheat for hay should be sown early in the season, in order that it might obtain a good start. An abundance of super. should be provided to force its growth, and cutting should be carried out when it was well in the grain stage. Stooking should be done immediately after cutting, and stacking should not be commenced until the whole crop had been cut. Chaff-cutting was best carried out in the early morning, as the hay was then generally a little damp, and it did not split. The binder was the most suitable means of cutting the crop, as it entailed less waste, and sheaves were more easily handled than loose hay.

Parrakie, October 26.

PRESENT.—Messrs. F. J. Dayman (chair), A. J. Beelitz, H. Deiner, O. Heinze, W. Threadgold, R. F. Brinkley, F. W. Randall, F. W. Gravestocks, A. F. Dayman, J. Temby, jun., C. E. Hammond, R. L. Beddome, R. E. Jose, F. S. Dayman, M. Kildea, N. Good, M. Cooney, T. Willis, A. Heinkel, A. C. Hameister (Hon. Sec.), and five visitors.

HARVESTING.—The following paper was read by Mr. R. L. Beddome:—"There are three methods of harvesting adopted in Australia, viz., the use of (1) the binder and thresher, (2) the combined harvester, (3) the stripper and winnower. The farmer has to decide which of these is best suited to his particular locality and circumstances. (1) The first method—that of reaping the crop with a binder and threshing the grain by means of a steam threshing plant—can be eliminated as impracticable in our district. It has little to recommend it to the farming community of this State, except, perhaps, in the extreme South-East. Our choice, then, is narrowed down to the stripper or the harvester. Both of these machines have staunch advocates, and it is a highly debatable point as to which method is most profitable in mallee farming. The combined harvester, as its name indicates, practically completes in one operation all the work of gathering the grain

ready for market. It thus has an outstanding advantage over the stripper in labor-saving. Most farmers have experienced the difficulty of finding adequate labor at harvest time, and as the use of the harvester renders one much less dependent on that expensive commodity, naturally the machine has many advocates. In our district one man and a team with a 6-ft. harvester should be able to handle, say, 300 acres of crop—barring accidents. On the other hand, the harvester strikes one as being rather too complicated a piece of machinery, and too cumbersome to be worked successfully in our rough mallee country. We are asking rather much of such a machine in expecting it to work at anything like its best in this locality. For one thing, the country is too uneven; difficulties present themselves at once when the machine has to negotiate sandhills and heavy-going with intermittent solid and perhaps stony ground. It is far from simple to regulate the pace of the shake of the sieves, and the strength of blast from the fans, as the horses naturally slow down considerably when drawing the machine over the rises. The blast must, therefore, be increased going up a hill and should be decreased when on the down grade, or probably a lot of wheat will be blown over the sieves. Then the mallee stumps, of which quite a few are still to be encountered in our paddocks, are responsible for a lot of wear and tear to the harvester's mechanism, and will cause it to be cast aside when its lighter and less complex rival, the stripper, is still in good going order. Another drawback to the use of the harvester, though perhaps not of vital importance, is that any grain not properly ripe when harvest work starts is bagged up and is apt to be a source of damage to the sample and to encourage the presence of weevils in the barn amongst the wheat retained for seed and storage. The method of harvesting by means of the stripper or reaping machine has also much to recommend it, especially in new districts. The simplicity of the machine is a decided point in its favor. It is an easy matter to drive a stripper; and as there is very much less chance of mishaps and breakages occurring, much risk of expensive delays is obviated. Another great advantage of the stripper is that its use enables the farmer to save and utilise as much of the cocky chaff as he desires. After the experience of the past season members will no doubt agree that a good stack of cocky chaff is not to be despised, and will gather as much of it as possible this year, and thus save the haystack. Most of our settlers have been obliged to buy chaff at a fancy price this year, and no doubt those who had plenty of 'cocky chaff' saved their pockets to a great extent. I found that my horses worked well and kept in good condition through seeding on cocky chaff, moistened well with molasses and a small ration of bran or pollard mixed in, with a feed of long hay at night. The lighter draught of the stripper, compared with that of the harvester, is another point in its favor, and may compensate for the extra time required for winnowing, by saving considerable time in taking the wheat off. For instance, if a man were short of horseflesh he could get over more country with strippers in the same time; whereas, if he had a horse or two to spare beyond those required for the harvesters, he could utilise them to work two teams a day in a stripper. The drawback to the stripper is, of course, the extra manual labor required in cleaning the wheat; also there is the danger of rain damaging the wheat while in the heap awaiting the winnower. On the whole, looking at the matter from a local standpoint, at any rate, I think the stripper and winnower will be found the best and most economical method of harvesting, more especially in the case of those who have a large area under crop. In dealing with large blocks of wheat, one power winnower and a team of men can handle a very large quantity, and the capital cost of the machinery is very much less than that required to purchase sufficient harvesters to do the work; furthermore, the plant would still be in good order when the harvester would be on the scrap heap. A winnower would still be required on the farm even if all the wheat were taken off with harvesters, and as most farms have an engine in use to drive a chaffcutter, or pump water, &c., the same motor could be utilised to drive the winnower and do all such work. Farmers would be well advised to use the stripper in this district and save their haystacks and their horses." In discussing the subject, Mr. H. Deiner said that the regulation of the blast in the harvester when going up or down hill was simple. The wear and tear of the machine was not greater than that of the motor winnower. Mr. Good favored the use of the harvester, as during the summer it was possible to get into the crop at least three hours earlier than was the case with the stripper. Then it was a difficult matter to secure a suitable floor for the wheat in this district. Mr. A. J. Beelitz, who had used both machines, preferred the harvester on account of the fact that it enabled the farmer to start earlier in the morning, and there was not the waste that was occasioned with the stripper. Mr. A. J. Dayman agreed with this view. Mr. Jose thought the land in this district too rough to admit of the advantageous use of the harvester. The wear and tear would be a heavy item. Mr. Temby, who had gathered his crop last year with harvesters, had come to the conclusion that the land was too rough for the machine.

PROTECTING HAYSTACKS.—In a paper on this subject, Mr. R. F. Brinkley drew attention to the necessity of selecting a fairly level spot on rising ground, free from water-courses, on which to build the stack. A stone platform 6in. above ground at one end, sloping to ground level the other, and raised about 6in. above the sides in the centre, should be provided. This should be coated to a depth of about 1in. with cement. Where the practice of putting a layer of straw on the ground, and building the stack on this, was adopted, there was considerable waste, on account of the straw drawing the moisture from the soil, and thus spoiling the first layer of sheaves. A shed should be constructed over the platform, with a sliding roof placed 20ft. from the ground. Six feet galvanized iron, put 1ft. in the ground and with 9in. bent outwards at the top should be used as a fence to protect the stacks from mice. The iron roof would provide a good catchment, and the water could be run into an underground tank, sunk at least several yards away from the bottom of the stack. A tank of 20,000galls. capacity would be found ample for a 70-ton hay shed. The provision of accommodation as recommended above for hay, should result in a saving of at least 8 tons that would be lost if the stack were placed on straw and thatched. Members generally agreed that it was advisable to adopt the suggestions of the writer of the paper where the means of doing so were available.

Parrakie. November 23.

PRESENT.—Messrs. F. J. Dayman (chair), A. J. Beelitz, N. Deiner, E., O., and A. Heinzl, W. Threadgold, F. W. Randall, F. W. Gravestocks, E. E. Hammond, J. G. Temby, F. S. and A. F. Dayman, M. Kildea, M. J. Cooney, N. J. and S. R. Good, T. Lewis, A. C. Hameister (Hon. Sec.), and four visitors.

FARM HORSES.—This subject was dealt with in the following paper by Mr. F. S. Dayman:—"In selecting a team for the farm we have to consider which is the most suitable horse, the heavy or the medium draught. I prefer the medium draught, which keeps in condition on less feed than is required for the heavier animal. If we take into consideration the general work a horse has to do, we will find that the former will work as well as the latter where sticks, stumps, or worst of all, sandhills are encountered. The medium draught also seems to be more hardy. If a farmer desires to keep a good team he must sell off his old horses, say, at the age of 12; and a horse, if he has been looked after, will sell well at this age. If he requires a young team he must go in for a little breeding, and I have always found that the medium draught mare is the better from which to breed. There is less danger of her slipping her foal and of experiencing trouble in foaling. Some farmers go to a lot of unnecessary trouble in breaking in their young horses. I do not believe in dragging them up by the neck to a post, attaching them to a log, and chasing them around. All this only frightens the horses and makes them timid. A horse should be run into a small yard and bridled; then driven out and taken as quietly as possible. As soon as it has been taught to lead it should be placed between two quiet horses and driven around a little in order to mouth it; then hook the three on to the harrows, afterwards placing the colt in the team. Members were generally agreed that the class of horses referred to in the paper was the one best suited to the requirements of the district. The manner of handling young horses recommended by the writer of the paper was not approved.

HAYMAKING.—The Hon. Secretary read a paper as follows:—"When putting in a crop for hay, it is advisable to sow hay varieties. A wheat that produces an abundance of flag is preferable to a clean strawed sample. It is also better to sow an early wheat, as this allows more time for stacking before later wheats are ready for the stripper or harvester. Much of the quality of hay is lost through its not being cut at the right time, which is just after the bloom is falling. At this stage there is more sugar in the hay and the stock do better on it. The binder is the best means of handling the crop, as it is least wasteful. It also makes it possible to cart and stack in windy weather, which often means a great saving of time. After the hay is cut it can lie a day or so before being stooked if the weather is fine; but if there are any signs of rain it should be stooked at once. The round stooks are the best, about 20 to 25 sheaves being put into each. If well stooked, rain will not hurt the hay. Under no consideration interfere with the stooks after rain; only stand up the fallen sheaves. The time of stacking depends on the weather; but as soon as the knot will break the hay is fit. If hay is left in the paddocks too long it loses in weight and nourishment. Another important point is the building of the stack. Tons of good hay are wasted through stacks being badly built. A haystack should not be built too wide, 5yds. is sufficient, and the sides should never be

higher than the middle. Great care should be taken to see that the hay is perfectly dry before carting. Even the slightest toughness in the centre of the sheaf renders it unfit to be put into the stack. Round corners are preferable. Old mallee posts or logs make a good floor for the stack. The correct method of building is to back up with the butts out, placing the butts of the second row nearly out to the strings on the outside row, and so on, until the centre is filled up. Building in this way makes the stack firm to stand on. When it is being taken down little damage will be done by fowls if a cut is left open, as the heads of the sheaves are nearly all covered. The heart of the stack should be kept well up, especially near the top. At all heights the ends should be higher than the middle, as they settle out and go down later on. If they are not kept higher at the edges whilst being built there is a likelihood of their slipping out. The stack should be wider at the eaves than at the bottom in order that rain may drip clear. When roofing, it is advisable to put the butts out. The roof should consist of a good coat of the best straw available, straightened out and carefully packed, then covered with wire netting. The straw should be mowed and handled in damp weather. If broken down with a chain or harrows it will not run the water off so freely. Do not have weights too heavy on the netting to hold it down, as they are liable to make the stack uneven. Stacks, as a general rule, should be built north and south, for when they are placed in the other direction little sun shines on the south side and there is a tendency for the wheat to germinate in the winter months." Members concurred generally with the views of the Hon. Secretary, but preferred leaving the hay uncut until there was grain in it. Several members thought the stacking method was out of date.

Pinnaroo, November 16.

PRESENT.—Messesrs. B. L. Harfield (chair), M. Beckwith, A. U. Burman, F. G. Bonnin, H. E. Dibbin, F. H., P. J., and R. Edwards, H. Fewings, H. J. Harfield, L. M. Hannaford, H. C. Hill, W. A. and M. Kelly, H. Leiger, J. Letheby, B. H. Nash, E. H. Parsons, A. I. Reed, C. A. E. Schiller, J. Scales, W. Venning, L. H. Wright, Geo. and W. Wilson, P. H. Jones (Hon. Sec.), and 10 visitors.

NITROGENOUS MANURES.—Mr. W. H. Chappell, M.P.S., supplied a paper as follows:—"The subject of manures is far too comprehensive to be dealt with in a paper of this nature, so I propose to confine myself to discussing the important functions of nitrogen and nitrate manures only in the scheme of natural economy. For the figures and analysis I am indebted to papers by Mr. Apin, Registrar of Moonta School of Mines. In beginning, let me give a few words in explanation of the element 'nitrogen.' It is a tasteless, odorless, colorless, inert gas, occupying in bulk about 79 per cent. or four-fifths of the so-called atmosphere. It neither burns nor supports combustion, and although not of itself poisonous, yet animals or plants, when placed in gaseous nitrogen and excluded from the air speedily die of suffocation. Therefore we see that in its natural condition it is absolutely of no use as a plant food, and although it is calculated that there are about 7 tons of available free nitrogen pressing upon each square yard of the earth's surface, yet plant life makes no use whatever of it in its free state, and it is only when it has been converted by nature—either chemically, or in electrical disturbance, or by the aid of the bacteria in the soil—into some of its compounds or 'salts' that it becomes essential to all forms of growth. The term 'salts of nitrogen' is not to be interpreted in the usually accepted sense. In chemistry the various elements of nature possess affinity for some other particular element, and the two are capable of combining together to form other substances, possessing characteristics perhaps entirely different from the two elements which evolved them. These substances we term the 'salts' of the elements from which they sprang. The great stress laid upon the value of these nitrogen salts as plant food has been fully borne out by the reports of the various experimental stations and laboratories of the Continent and America. From an extensive set of field experiments carried out at the Rothamstead Experimental Station in England, using combined nitrate and phosphate manures, the following figures have been proved:—The yield per acre, using the combined manures, was increased from 12bush. to 36bush., whilst by the use of nitrates only the yield per acre was increased from 12bush. to about 23bush. Similar results have been obtained in America, where the yield was increased by 50 per cent. by the judicious addition of nitrogenous manures. Of all natural nitrogenous manures the farmyard variety is the most valuable, and, I suppose, the most widely used. It consists of the solid and liquid excreta of animals, together with the bedding or litter. Its composition varies very considerably. The principal determining factors being—(1) The age of manure; (2) class of food fed to the stock; (3) kind and quality of litter supplied; (4) whether the manure has been

stored in the open or not; (5) length of time and manner of storing. The following analysis shows the general composition of farmyard manure:—

	Per cent.
Water.....	75.42
*Organic matter.....	16.52
Oxide of iron and alumina	0.36
Lime.....	2.28
Magnesia	0.14
Potash	0.48
Soda	0.08
Phosphoric acid	0.44
Sulphuric acid	0.12
Cl.	0.02
CO ₂	1.38
Silica	2.76

Thus we see that farmyard manure contains all the constituents, without exception, which are required to bring plant life to perfection. Its complexity of composition renders it difficult, if not impossible, to imitate it artificially. The solid and liquid excreta differ widely in composition—for, while the former contains principally phosphoric acid, lime, magnesia, and silica, and comparatively little nitrogen, the liquid contains practically no phosphoric acid, but is rich in alkaline salts, urea, and uric acid, which, on decomposing, yield ammonia, which is a nitrogenous compound; therefore, unless the two excreta are mixed a perfect manure is not obtained. Farmyard manure should be kept in heaps, covered with earth, and protected from the lixiviating effects of rainwater. Well fermented manure is more concentrated, and consequently more efficacious than fresh manure. During fermentation a large proportion of the non-nitrogenous organic matter disappears as carbon dioxide and water, whilst the nitrogen is gradually evolved and fixed by the humic acid present. The effect of farmyard manure lasts from 10 to 15 years after its application has ceased. Light land is benefited through the added organic matter, and heavy soil attains a more open texture and is much more easily worked after its application. It is of particular value to the market gardener. The chief remaining form of natural nitrification of the soil is by what is known as 'green manuring,' or the ploughing in of green crops of the leguminous order, such as peas, which are known to add nitrogen to the soil through their relationship to the bacteria contained in the soil. These bacteria are 'certain microscopic organisms existing in many soils, which, given favorable conditions, are capable of fixing nitrogen and rendering it available for plant food. They do this best when living in a state of symbiosis with such plants as the pea and other legumes, symbiosis being a kind of co-operative existence in which the bacteria derives a certain part of its support from the plant, and in return supplies it with nitrogen in an easily assimilable form. Under the heading 'miscellaneous nitrogenous manures' come such substances as seaweed, wooddust, horns and hoofs, dried blood, soot, and sewage, &c.; dried blood being one of the most valuable, it is eagerly sought after by the manufacturers of artificial manures. The chief artificial nitrate manures are the salts of potash, soda, and ammonium. The first two are found as huge deposits in the soil in various parts of the world, notably, India, Chili, and Peru. From the latter country alone over two million tons have been exported to Great Britain. They are chiefly the products of the sewage from large cities. As a quick acting nitrogenous manure probably the best is nitrate of soda. It is said to be without rival as a top dressing for either corn or root crops. It should not be used in large quantities, owing to its tendency to exterminate plants of the leguminous order and to its effect upon the quality of the grain. It can be used with superphosphates, and on account of its great solubility is very useful in dry years. Similar to sod. nit. is ammonium sulphate. It is obtained as a by-product in the destructive distillation of coal and shale and manufacture of coke. It does not act as quickly as nitrate of soda and is not as soluble, but it is to be preferred in a wet season. If used continuously upon soils deficient in lime it will cause sterility on account of acidity. This may be corrected by the addition of lime to the soil. Calcium nitrate and calcium cyanamide, both rank high as artificial manures, but they possess drawbacks that the previously mentioned two do not. The cyanamide gives off a very considerable quantity of heat when mixed with phosphatic manures, whilst calcium nitrate, owing to its property of absorbing moisture from the air, becomes sticky and difficult to handle in the drill. Every ton of wheat taken from the soil takes with it approximately 40lbs. of nitrogen, every ton of oats takes about

*The organic matter, 16.52 per cent., is equivalent to 0.59 per cent. available nitrogen in the form of ammonium sulphate.

45lbs., and every ton of hay about 35lbs., and since the supply of nitrogen, in an available form, is limited, a stage can easily be conceived in which the supply would be almost, if not totally, exhausted. We frequently hear the argument that continuous application of superphosphates tends to rack the land and rob it of its fertility, but the foregoing would seem logically to suggest that, from constant cropping and burning off of the straw the land has become deficient in nitrogen, consequently the yield falls off considerably. Of course, all soils vary greatly in composition, and what is true of one district is not applicable to another. The only way in which we can ascertain the requirements of our soil is by experiment; this means a deal of valuable time, but the result surely justifies its expense. Agriculture has advanced immeasurably since the introduction of artificial manures, and every season brings a batch of new manures for which much is claimed. The farmer who is familiar with the wants and peculiarities of his land will be in a better position to say what manure shall be used than the man who simply follows his neighbors' lead, or places his trust in advertisements."

Sutherlands, October 26.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. Snell (chair), Geyer, Hensler, Thiele, Badge, Dohnt, Mibus, and Twartz (Hon. Sec.).

CHARCOAL BURNING ON THE MURRAY FLATS.—The following paper was read by Mr. J. Badge:—"The reason mallee charcoal is so valuable is because of the suction gas engine plants, which have only been on the market a few years. Retorted charcoal, by the analysis of the State Government shows a fixed carbon content of 79 per cent., while English analyses state that it contains 95 per cent. The charcoal, which is almost pure carbon, combines with oxygen, forms the gas, and the white ash falls to the bottom of the fire-bars or ash-bin, when used in the above plants. At present I am burning four retorts. These are simply constructed of ordinary corrugated iron, consisting of an inner and outer shell, similar to two round tanks, one inside the other, leaving a space between the tanks of 4in. to 5in., which is filled with earth. The roof is made of steel sheet iron in the shape of a cone, which rests on the inner tank or shell. It has two vent holes in the roof for lighting. I place earth to a depth of 3in. or 4in. over the roof to keep it airtight. It has one large door at the bottom and a small door at the top on the opposite side. When the retort is partly filled from the bottom door it can be closed, and the small door on the opposite side used to fill it. Then close that door, get on the roof, open up the two vent holes, procure some chips and bark and a few dry leaves, put them into these vent holes and apply a light, always from the top. There are four or five vent holes at the bottom of the retort to supply the draught. A good fire will be distinguishable by a dirty yellowish-grey smoke coming from the vent holes at the bottom; close down the two vent holes on the roof, then the carbonisation proceeds. Burn for 24 to 30 hours, and when a light sky-blue smoke appears close it down to prevent any air getting into the retort and allow it to cool. Then remove the bottom door and commence bagging. I find that the second growth of mallee is the best for burning. I put between 32cwts. to 2 tons of wood into a retort and get between 13cwts. to 16cwts. out, so with six retorts going 7 tons of charcoal per week should be secured. The present price is £2 15s. on trucks, Sutherland. Two men are able to look after six retorts and do their own carting, providing the timber is within a radius of a mile. Two men at £3 a week each is an expense of £6; a good cutter, equal to 4 tons per day, at 2s. per ton is £2 8s.; two horses and wagon, £1; a total of £9 8s. deducted from £19 5s. leaves the handsome profit of £9 17s. per week. A good piece of charcoal rings like a bell; it is a bad conductor of heat. Most of the big mallee is more or less pithy, and I would put any pithy wood and logs in the centre of the retort and so give them a good burn." Members generally agreed that it would pay the farmer to burn his wood to charcoal before carting it to market.

Walkerie, October 28.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. T. G. Rogers (chair), A. Lewis, J. C. Rowe, W. J. Green, E. J. Burton, C. Promnitz, W. Frahm, R. Stanley, S. Modistach, C. Borroughs, J. Jachman, J. J. Odgers (Hon. Sec.), and one visitor.

CURL LEAF.—Members reported that last season this was very bad on the peaches, but it was not showing this season. Some had sprayed and considered this had prevented the trouble, but other members had done no spraying and yet their trees showed no sign of curl leaf, although they were badly affected last season. It was thought that the heavy winds experienced had caused the trees to be clean.

HAY CROP.—The hay crop was reported as being very poor, and unless rains fell shortly the wheat crop would be likewise. Fallow lands and early wheat were better and would probably yield a good crop.

IRRIGATING APRICOT TREES.—Mr. Green read a paper on this subject, as follows :—“The correct times at which to irrigate apricot trees are as follows —(1) Before the buds burst early in September, as it is essential that the ground should then be in a moist condition to carry the buds through the blossom period. (2) After the fruit has set, say about October 1st, in order to give the spurs and fruit a good start. (3) Whilst the stone is forming late in October or early in November. This should be the heaviest irrigation, for the energy of the tree is taxed to its utmost, and it should be kept nourished if a good sample of fruit is to result. (4) When the stone has formed and set hard early in December, for then the flesh has to be put on, and it is a mistake to irrigate late as it tends to make the fruit sloppy, and it then dries light.” In the discussion, Mr. Borroughs agreed with the statements made in the paper. Last year, owing to the lack of water, the fruit dried thin. The stone grew without the water, but the water gave thickness of fruit. The principal point was to get water at the right time, even if a little less than was necessary had to be taken. Mr. Jachman reported that many buds on his trees this year did not come out into blossom. Mr. Rogers believed in winter irrigation. Mr. Stanley had 12 hours water in May, but he did not see that his trees were any the better for it.

SOUTH AND HILLS DISTRICT.

Blackwood, November 11.

PRESENT.—S. W. Chapman (Cherry Gardens Branch, in chair), W. L. Summers, A. W. Magarey, A. W. Carlos, R. Eglinton, A. A. Magarey, J. Turner, F. Andrews, C. Shearer, G. F. Dall, F. Dall, H. E. Sibley, A. A. Philips, P. H. Williams, A. J. Penno, J. Nicolle. T. Hunter, C. G. Savage, four members Cherry Gardens Branch, and one member from the Longwood Branch.

PRINCIPLES UNDERLYING ORCHARD PRACTICES.—Mr. W. L. Summers read the following paper :—“I propose to deal with a few general aspects of orchard work, with a view to causing us to think *why* we are doing certain things, in the belief that as a result we shall in the future do these things better than we have in the past. Why do we plough, cultivate, harrow, &c. ? To deal with this question in detail would take several evenings. It is absolutely necessary, however, to have some definite reason as to why we cultivate (to use the term in its wider sense), because without this we cannot know how or when to act to secure the best results. Let me refer to a few general principles. The soil must contain not only sufficient water, but also sufficient air for the healthy development of the roots of plants. If either is in excess or deficiency we fail to secure the best results from our work. Within reason—other things being equal—the moisture-holding capacity of the soil increases with the fineness of division of the soil particles. It is therefore necessary in a dry district to work our soils down to a fine tilth, as this will tend to secure the desired proportion of air and moisture therein. If the soil is lumpy we have too much air and not enough moisture ; if the soil is overcharged with water the air is forced out and the plants cannot thrive. Hence the necessity for under-drainage under certain conditions. A well-broken soil is said to retain nearly twice as much moisture as a compact or hard soil of the same characteristics. We should therefore, in a firm setting soil, plough deeply. We must get the moisture into the soil first and then work it in order to retain it during the dry weather. A dry earth mulch over a firm subsoil permits the water from the lower layers to move upwards to the roots of the plants, and at the same time prevents excessive evaporation. Bearing these facts in mind, it naturally follows that the ‘when’ and ‘how’ of cultivation will vary according to the nature of the soil, the climate, the rainfall, and the crop we have to deal with. A careful consideration of the reasons for tillage will enable the grower to do his work in this direction under the best conditions, at the right time, and at the least expense ; but, while we can each profit from our neighbor’s experience in the matter of tillage, we must modify practices according as our conditions vary. Why do we spray our peach trees for the prevention of curl-leaf at one season and our apricots for prevention of shothole at another ? A knowledge of the differences in the life history of different fungi is necessary to enable us to decide when is the best time to spray. It is practically impossible, especially in a large garden, to do all this work at exactly the right time to attain perfect success, but we can get very near it if we know why a particular time is best to spray

to prevent injury by a particular fungus. Take the two I have mentioned. For curl-leaf we spray as soon as the buds show definite signs of movement in the spring, because the spores of the fungus are lodged in the bud scales, and germinate practically as soon as the flowers come. To prevent injury we must have a thin coating of the fungicide on all parts of the tree, so that the roots (this is not the technical term, but conveys what I mean) come into contact with it and perish. If our spraying is delayed through ignorance, neglect, or climatic conditions until after the fungus has obtained entrance into the young leaves, buds, or stems the mischief is done, and later spraying will not cure the trouble. On the other hand, shothole affects the leaves and fruit at a later period, and not only is it correct to spray when the trees are relatively more advanced, but as the disease spreads over the surface of the fruit it can be checked by a late spraying, and, provided it has not advanced too far, the damage already done may be to a large extent remedied. The mildews on vines and roses are also surface workers, and preventive measures are based on the knowledge of this fact. Why do we prune our trees? Because we know that if left to nature they would not produce either in quantity or quality profitable returns. Nature's object and man's in the matter of fruit-production differ, and it is therefore necessary for us to control nature to work in our way. Before we can prune our trees successfully we must know something about the habit of growth and the nature of the fruit-bearing wood of the different kinds of trees. We must further study the different varieties of the same class of tree; the effect of difference in soil and climate, and so on. A knowledge of the characteristics, habits, and requirements of the different varieties is necessary to enable us to determine which suit our particular conditions and objects, and the absence of this knowledge is the cause of some of the most costly mistakes of the fruitgrower. In this particular point we can and should derive much profit from the experiences of other growers. As a final instance let me mention the necessity for thorough spraying early in the season for codlin moth. Numerous experiments have shown that most of the first brood enter in or near the eye of the fruit, and if we are to prevent their entry this portion must be coated with the spray in order to poison the young caterpillar. Better results would be obtained from one thorough spraying just about the time the petals have all fallen than from three or more later sprayings if the first is omitted. Bear in mind that every caterpillar that escapes out of the first brood means an apple or pear lost, and probably half a dozen second brood caterpillars to contend with. Keeping this in view the necessity for thoroughness in the first spraying will be readily appreciated. My paper may be somewhat general in its scope, but my object at this first meeting of the Bureau is to emphasize the necessity for having at least some idea of the 'whyfor' of our work before we do it.'

Cherry Gardens, October 22.

(Average annual rainfall, 35-3in.)

PRESENT.—Messrs. S. W. Chapman (chair), C. Lewis, C. Ricks, T. Jacobs, H. Jacobs, J. Brumby, G. Hicks, A. R. Stone, H. Lewis, T. Jacobs, jun., J. Lewis, J. Mildwater, J. Tozer, E. Broadbent, S. H. Curnow (Hon. Sec.).

HAY-GROWING.—Mr. Hicks read a short paper, in the course of which he pointed out that owing to the fact that it was impossible to use anything larger than a double furrowed plough in the Hills district, the growing of hay was not as profitable as it was in the case of more open districts. Where attempts were made to grow crops it was essential that the ground should be well worked and liberal dressings of manure should be applied. Mr. T. Jacobs expressed the view that taken over a period of years it did not pay to grow hay for sale in the hills. Mr. Ricks drew attention to the fact that a total failure with the hay crops in the hills was not known, and in the drier years it certainly paid. In reply, Mr. Hicks said he preferred bonedust to superphosphate, and he thought King's Early and Golden Drop wheats were rather early for this district. Mr. J. Brumby had cut King's Early in October, and the crop had been ruined through rain. Mr. C. Lewis had found that King's Early made a splendid cut for early green feed.

Longwood, October 26.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. W. H. Hughes (chair), A. E. Glyde, H. Vogel, J. Roebuck, Beaumont (Inspector of Gardens), J. R. Coles (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. A. E. Glyde. An inspection was made of some apple trees which were suffering from dieback, and the theory was advanced that in all probability the trees had carried heavy crops of fruit

last year, and on account of the somewhat adverse season the sap had failed to reach the end of some of the extended branches. Mr. Beaumont said the trouble might possibly be due to the root-borer.

Lyndoch, October 24.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), H. Springbett, P. N. Burge, G. W. Warren, H. W. Lawes, J. Linke, and J. S. Hammat (Hon. Sec.).

BUDDING.—The following paper was contributed by Mr. Woolcock :—"The method of working buds or stock to different varieties of trees is not only simple and effective, but also economical. One can easily bud from 400 to 500 in one day. To begin, be very careful in selecting the buds, taking only from trees that have borne the finest quality of fruit, and using only well-developed buds. For summer buds the work is done about the end of November or as soon as matured buds can be found on summer shoots. If the stock is in good growing condition, it can be done at any time, although it is not advisable to choose days when there is a hot, dry wind blowing. Medium sized shoots are the best, and the top and base buds should be rejected as too soft and over-ripe respectively. It is essential that the buds be on wood that is half ripe, plump, and having no further growth to make beyond maturing. I prefer using wood buds that have clustered around them two or more fruit buds. They are easily distinguished, being long, thin, and pointed, while fruit buds are thick, round, and blunt, except in apricots, which have flat wood buds, and pointed flower buds. Where there are two or three buds at a joint, one is usually a wood bud; this applies to stone fruit. The shoots of all kinds of fruit trees from which the buds are taken must be healthy, and the quicker they are inserted the better; this is the reason men accustomed to the work are more successful than amateurs, as they never mutilate a bud when cutting it, and from the time it is cut until it is inserted is only a few seconds. Shoots should always be wrapped in a damp cloth or bag to prevent them drying. While it is desirable to keep them cool and damp, I would not advise putting them in water, as this tends to soften the bark, and when dried, it will be found to be slightly wilted, which is to be avoided. A competent budder always carries his shoots wrapped up in something damp, and in cutting off a bud he uses a very sharp budding knife, and severs the bud from the shoot with one clean cut and with a small piece of wood, which he removes with the point of the knife and thumb nail. Before cutting the bud make a T-shaped slit in the stock: this being done, with the handle of the knife raise the bark on either side and insert the bud as soon as possible. Be careful to remove the small piece of wood before doing so. In budding nursery stock from 3in. to 6in. from the ground is the most suitable height. For dormant budding autumn is the best time. In winter the stock can be cut to within 4in. of the bud, that is, for deciduous trees. If for citrus trees, it is best not to cut until growth starts in the spring. Only one shoot must be allowed to grow from each bud, and when it has grown 8in. or 10in. it must be tied to the stock above the bud. Keep all suckers off the stock and laterals from the buds. As soon as the buds are sufficiently strong to support themselves, cut the top part of the stocks back to the buds. The main point is to get a good flow of sap into the stock, and it is advisable to water about two days before commencing, especially for autumn work. Get the bud ready as quickly as you can, and insert it into the T-shaped slit. In removing the small piece of wood take care you do not injure the eye, or the bud will die. In tying the bud I use what is known as lamp cotton, as it is soft and not likely to interfere with the sap flow. Always commence from the base, and in cutting leave the stock of the leaf attached to the bud as it is necessary for the well-being of the bud, also a great help to the budder in holding the bud for insertion."

MacGillivray, October 22.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, A. J. Nicholls, H. E. Petras, A. Stirling, sen., H. J. Wiadrowski, H. C. Williams (Hon. Sec.), and one visitor.

TANK-SINKING.—In a paper on this subject, Mr. Ayris stated that in selecting a site for a dam it was advisable to secure one where there was a fairly even fall in the country, to prevent the formation of washaways. He advised the sinking of a trial hole to a depth of 12in. to 18in. to ascertain whether the ground was suitable for the purpose. A tank 25yds. by 25yds. and 6ft. deep, with batters of one in four should be sufficient for the majority of farmers in this district. If there were a watercourse available, the dam could be sunk on one side of this and an embankment put across the course, the water being allowed to overflow into the dam. If it were necessary to make the dam in the water-

course, a small receiving hole, about 5yds. from the main dam, with an embankment between, should be built. The water could be transferred from one to the other by means of a wooden duct cylinder, 3ft. wide by 1ft. deep, running into the corner of the main dam. One of the advantages of having a small receiving tank was that it usually dried out before the other, and the owner was thus enabled to clean it out. When ploughing it was advisable to mark the ground out in lands, as then the horses did not work on the ploughed soil, and thus trample it down hard. Where two teams were available one could be ploughing while the other was scooping. During the discussion, the writer said he always commenced ploughing by going around the sides. The dirt from this was scooped to the corner of the embankment. Amateurs or novices generally failed to keep corners flush. The next thing was to plough a strip in the middle, and for a 25yds. square tank he took out a piece 18yds. by 4yds., then ploughed across the end. Perpendicular sides were dangerous for stock, besides being almost certain to be pushed down when the animals were entering the water; and in the event of a porous strata existing, leakage would occur unless the slope of the batter was such as to allow the tramping of the stock to effectively puddle it. If practicable the water should be pumped into troughs, thus preventing pollution. Leaky tanks were often made sound by utilising them as a temporary sheep camp during wet weather. The scoop for ordinary farm use need not be large; the buckscraper with a capacity of $\frac{1}{2}$ yd. served very well. If the necessity arose for weighting the single furrow plough, nothing was gained by placing the weight on the front part. It should be put on the handles.

Meadows, November 26.

(Average annual rainfall, 34 $\frac{1}{2}$ in.)

PRESENT.—MESSRS. G. Ellis (chair), J. Catt, F. W. Vickery, F. E. Vickery, T. Usher, H. A. Kleeman, W. Milligan, F. Nottage, W. J. Stone, and W. Bertram (Hon. Sec.).

SELECTION OF COWS FOR DAIRY HERD.—The Hon. Secretary read the following paper:—"There are certain homely signs which are helpful to the man who sets out to find a cow for his dairy. Some of these are as follows:—The cow should be of fairly good size, so that she can eat a good ration. She should have a large, well-shaped udder and good-sized teats. Following the milk vein along to the entrance to the body in a good cow we would expect to find a hole large enough to take the second finger readily. Some hold that the vein itself should be large and crooked. The cow should have a thin neck and slender tail. She should be wide between the hind legs, and stand handling well. When being milked she should enjoy the process if the milker is a good hand at it. A couple of rudimentary teats behind the four fully developed is a good indication. This matter of picking out a cow has proved so unsatisfactory to a great many men that they have come to the conclusion that they can better afford to raise their own cows from calfhood than to trust their judgment to select them from other herds. There is a satisfaction about this that goes a long way. If the heifer should fail to turn out well we cannot blame anyone but ourselves, whereas, if we trust the man from whom we buy, and then our expectations are not realised, we are quite inclined to find fault. The quality of the cows for milk-yielding is more important than the number, for there are many small herds that make more clear money for their owners than others twice as large, giving poorer milk, a smaller quantity, or having a short milking period. The breeding of the dairy cow is, of course, a matter that requires attention; but one of the conclusions reached by modern dairymen, both practical and scientific, is that the individuality of the cow, so far as her own profitableness is concerned, counts for more than either breed or breeding. There are good paying cows in all breeds, and there are cows that pay badly or not at all in all breeds. The selection of the profitable cow, therefore, depends principally upon what she can herself do, and this depends upon four points—the richness of the milk, the quantity of it, the length of her period of lactation, and the feed cost of its production; in other words the cow is to be kept all the year round, and her milk is for the most part used for making butter or cheese, or both. The question, then, is not how much milk, or how rich the milk, or what she can do in a week, it is to what extent can she produce butter-fat the year round, and at what cost in food does she produce it? There are many large producers that are not profitable producers, and there are those that seem to accomplish less, but the production is made at a sufficiently less cost to render them profitable when other animals that seem to do more are maintained in the herd at a loss." The Chairman expressed the view that cows in this district were generally given insufficient feed. Mr. J. Stone remarked that cows coming to this locality from salt country did not do too well, although Mr. Milligan believed that given sufficient feed, especially green, they would do well. Mr. E. W. Vickery mentioned that it was a mistake

to discard a heifer on the results obtained after the first calf; frequently there was a very decided improvement after the second calf. Mr. T. Usher said dairymen could not raise such a number of heifers on a small holding as would enable them to adopt a policy of selection.

Meningie, October 26.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. J. Williams (chair), Deane, A. Ayris, R. and A. Dainty, Scott, Hill, W. H. and S. Yates, Mincham, Tregilgas (Hon. Sec.).

OATS AND WHEATEN HAY.—Mr. Williams gave his experience of attempts to grow a mixed crop of oats and wheat for hay. On two occasions he drilled in oats and then cross-drilled the wheat, and on a third occasion both seeds were drilled in together, but in each case the crops were a failure. In the first two instances the seeding was on new land, but in the latter case on land that had previously been cultivated about 30 years ago. Mr. Yates had also tried the same wheat (Correll's No. 7) for three years, but it had not been a success.

Mount Barker, September 26.

PRESENT.—Messrs. H. N. Bell (chair), L. Hughes, B. and J. Pope, C. Crompton, E. Schmidtke, B. Fidler, J. Brinkley, J. Smith, C. G. Braendler, E. G., J. F., and C. Liebelt, C. R. Zilm, J. B. Paech, L. F. Liebelt, H. Pope, P. and W. T. Stephenson, J. and G. Cleggett, W. Morris, F. Simper, F. and H. Treleaven, F. Follett, D. Wollaston, A. B. Blades, J. Thomas, B. Barker, G. Jones, H. Jones, S. J. Bishop, R. Alexander, J. Frame, Ragless, L. and A. E. Cornish, J. Woolley, A. Herbertson, D. L. G. Monfries (Hon. Sec.), and three visitors.

THE POTATO.—Mr. J. Pope gave the following paper:—"This vegetable was introduced into Europe almost contemporaneously by Spanish adventurers, and by Sir Walter Raleigh who took some roots to Ireland in 1584. It belongs to the order *Solanacea*, to which also belongs the deadly nightshade. There are two factors that are essential for successful potato culture—(1) Good cultivation, (2) good seed. It does not pay to have bad seed and good cultivation, neither does it pay to have good seed and bad cultivation. To get the best results these two must go hand-in-hand or a good deal of the profit will be lost. The man who pays a good price for good seed and neglects cultivation is most likely to court failure, and he who cultivates his soil well and plants run-out seed is not at all likely to be pleased with the results. It always pays to get a change of seed every two or three years, as the following experience will show:—From old seed grown in the same class of soil for some years from 11 rows we dug 15cwts., and from five and a half rows of imported seed grown alongside we dug 30cwts., the old seed going about 2 tons, and the imported seed about 8 tons per acre. This soil was well cultivated, but the difference of the results clearly shows that it does not pay to cultivate well and have run-out seed. It is usually the custom to sell all the best and plant the worst of the tubers and leave none for the pigs. Large cut seed gives by far the best results, but it is much more expensive to plant large cut seed than to plant round small seed. It does not always pay to plant large seed on account of the great cost of the tuber and extra cost of cutting. We believe that equally profitable results can be obtained because of the less cost from round seed, but it must be grown from large seed. There is no seed that will degenerate so quickly as the potato. For anyone going in for a fairly large area the cost is a big item, and we recommend round seed for early planting as it is not so liable to rot; and also for late planting if there is a lack of moisture, for the round will germinate where a cut seed will not. Select the seed potatoes from the best plants, lay them out thinly, give plenty of light, under pine trees is the best place, keep them turned over every two or three weeks, using a shovel. Rain does no harm. After they have become green frost will not hurt them. Do not let the sun shine on them, as it injures the shoots. If short of room, and there is no convenient place to store them, bag them up in old super. bags and let them remain anywhere in the weather through the winter so long as the wet does not lie under them. They will keep better in this way than stored in a barn. The best course to adopt is to buy some old cases, make trays 2in. or 3in. deep and on these spread the seed out thinly and expose to plenty of light in any old shed or in the shade somewhere. The potatoes become green and hard, and

when they get shoots it can be easily ascertained whether every potato will grow or not, or if they have strong shoots or not. Only the best with strong shoots need be planted. If this method is followed, and those with strong shoots are planted in separate plots, seed for another year can be selected from these. Plough as early as possible in the spring when the ground is in a fit condition. Do not work the soil when wet. It is better to be a little late and have the soil in good order. If it is heavy leave it exposed to the sun to dry. After the rain has fallen harrow it to a fine tilth. As an alternative harrow down after the first ploughing, and cultivate as soon after rain as you can get on the land. The land should be ploughed two or three times, and the cultivator should follow in each case. If using farmyard manure this should be carted on before the first ploughing in order that it may be well worked into the soil. Fertilisers should be drilled in after the first ploughing some time before planting. If a late crop is required keep the ground worked after rain, and do not let the surface get baked, or you will lose the benefit of the rain. Deep ploughing (9in. to 12in. deep) is absolutely necessary. Subsoiling is to be preferred, as it loosens the subsoil without bringing it to the surface; a little clay does no harm, in fact, where a little clay has been mixed we have had the best results. Plenty of cultivation before planting saves working afterwards and keeps the ground clean of weeds. Potatoes should not be grown more than twice on the same ground, they prefer new land to soil that has been under cultivation; but this cannot always be had, therefore we recommend that a crop of peas be grown directly prior to a potato crop. They can be either ploughed in as green manure or harvested. Our experience is that with the aid of, say, 3cwts. of super., 2cwts. bonedust, and 1cwt. of potash, you can double the crop, and it is almost as good as farmyard manure and much cheaper, and will build your land up for future crops. In this district we are pestered with sorrel and wild oats, and there is no better method of getting rid of them than by the preparation of the soil for the late planting of potatoes. If a storm damages your peas and hay you have some consolation in that it is not also spoiling your potatoes. We have never yet experienced poor crops of hay, peas, and potatoes during the same year. If one has been poor the other has been good. Hence the wisdom of including potatoes as one of the main crops. As soon as you have finished with one the other is ready for you, and as soon as you have sold one you can start selling the other, and there is always money coming in. We strongly advocate late planting for these reasons. If you plant early, say, at the end of August or beginning of September, you will almost be sure to encounter frost or a heavy fall of rain which will set the ground down hard, and it then quickly loses the moisture and rots the seed. Just when you want the moisture to form the tubers, hot dry weather sets in, the ground is baked down hard, and the moisture is gone. If you try to cultivate them then the ground breaks up cloddy, and trouble is experienced with the grub. Early potatoes will not keep as well as late ones. In growing late crops soil of a sandy nature which can be kept worked is needed. This should conserve enough moisture to keep the crop going for eight or 10 weeks, planting from the middle of December to Christmas. To do this a late variety is needed. By the time the tubers begin to form in March, or early in April, the days are getting shorter, and nights dewy, and rain is more likely to fall when the potatoes need it. They will keep better, be freer from worms, and be of a better quality. Some growers are not successful because they do not plant the right variety at the right time. It is a bad policy to plant a late variety early; they will very seldom do any good. There are some varieties that do well early and late, such as Carmen No. 1 and Pinkeye, but it is absolutely no use planting Snowflakes early. You will get plenty of tops but no tubers." After the reading of the paper Mr. Pope replied to a number of questions. He had tried the so called frost-resisting potatoes, but they were not a success. Snowflakes stood the frosts better than any other variety, and he advocated planting Carmens in the middle of November and Snowflakes in December. Irish blight was a disease due to climatic conditions. The advisableness of hilling the potatoes depended on the ground in which they were planted. It was much easier to drive the digger when the practice was adopted. Heavy land was too costly to work, was apt to bake hard, and there was usually more trouble there with worms. One good strong eye was enough for cut seed. The tubers should be planted about 3ft. apart, and buried to a depth of 4in. or 5in. The most suitable dressing of manure was 3cwts. of super., 2cwts. of bonedust, and ½cwt. of potash. Blood manure was not particularly good, but applications of lime were very beneficial. A pea crop, sown with 2cwts. of bonedust, ploughed under, and then 2cwts. of super. put in with the potatoes, provided a good manuring. Potatoes did not appear to impoverish the soil, as crops off land previously under potatoes generally were better than those off land sown to other crops. He always secured seed from a district where there was volcanic red soil. The best variety was Carmen.

Mount Pleasant, November 9.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. H. A. Giles (chair), F. Langford, P. Miller, V. Tapscott, and D. C. Maxwell (Hon. Sec.).

THE HORSE.—This subject was dealt with in the following paper by the Hon. Secretary :—“If you are breeding horses for sale, breed the horse that will command the most money. If for use on the farm, go for that class of horse which is most suitable for the work he has to perform. My experience has been that, if you require a fair number of horses to work your farm, say eight to ten, the best plan is to have two or three medium weight horses, and the rest heavy draughts. The medium weights are especially handy for using in the spring dray, or light conveyances, and for harrowing, &c.; they will do much better than the heavy draughts. You can get a fair amount of work out of the latter at 2½ years old. Work him fairly hard on the farm till he reaches the age of 6 or 7 years, and then sell him for work on the road; as he is worth more to a carter at 6 years old than he is at 3. It is quite possible, by judicious breeding and feeding, to produce an animal entirely different from its ancestors. For the ordinary farmer three classes are quite sufficient—draught, medium, and light. It does not matter whether the draught horse is a Clydesdale, or a Shire, or a Percheron, or a Suffolk Punch, if he has plenty of weight and quality, is sound in every particular, and has a thoroughly sound draught pedigree, I would breed from him. The same applies to light horses. Where horses are required for special purposes it may be necessary to stick to one special type, but I am speaking broadly as to what I think is best for the average farmer. It is necessary to have breeding mares, as well as stallions, whose ancestors have been sound, and not too far removed from the type which one wants to breed. A Government stud book is absolutely essential, in order that these particulars may be ascertained reliably. As already stated, I am in favor of having two or three medium weight horses on an average sized farm, and in order to produce these I will give my plan of breeding. I should have a well-bred light mare, put her to a light horse for the first foal or two, then put her to a draught horse; the result will most likely be a very serviceable animal. I do not think it advisable to breed from this cross, as the progeny may go back to either extreme. With regard to feeding, I think the foal should run with its mother for about five months. If you want to work the mare, it should be tied up, or shut in a loose box while the mare is at work, and it should have some chaff and bran, or greenfeed, or nice sweet hay to pick at. If the mare is very hot when she comes in from work, do not let the foal suck until she has cooled down. At five months the foal should be weaned, and given feed that does not require too much chewing, such as chaff and bran, and a little crushed oats. I do not think it advisable to give foals oats, or grain of any description in large quantities; in fact it is inadvisable to give much grain to young horses at all, until they are 4 or 5 years old. After the foal has been weaned the best feed for him is grass; have a good paddock, and there is not likely to be much trouble with him until he is fit to break in. After breaking, the most important point is to feed in such a way as to keep him in the best possible health. I make a point of feeding as much as practicable on long hay, if the crop has not been grown too strong. While the horse is young, if he has to chew his food, it helps to keep him healthy; if there happens to be a particular rush of work on, it may be necessary to feed almost entirely on short feed, so that the horse may have time to rest, but in ordinary times I should never give short feed at night. It is a good plan to vary the feed as much as possible; one feed per day of cocky chaff mixed with oats and bran is more healthy and economical than chaffed hay. A rule of feeding which I favor for ordinary farm work is as follows for a draught horse :—Morning feed—one-third of the old size wheat bag of cocky chaff, ½ gall. of oats, and ½ gall. of bran, mixed together, and damped with ½ gall. of water; dinner time—8lbs. of good hay chaff and ½ gall. of oats or bran; night—as much long hay as he will eat. With a ration of feed something like this, and plenty of good clean water, we are not likely to be troubled with much sickness amongst our horses. I have never been in favor of giving horses large quantities of any grain, except oats; and oatens hay (that is, Calcutta, Cape, or Algerian) is a more healthy feed than wheaten hay. Never cut white oats for hay. Professor Perkins, in his interesting paper on ‘Barley,’ read at the recent Congress, advocated the use of that cereal for working horses. (See October Journal, page 331.) His plan may be worthy of trial, although in our district I think oats are preferable. In so far as working is concerned, the first and one of the most important points is to teach the horse to tie up. If he is tied up as a foal there is less risk than if left until grown up. I should break him in at 2½ years of age, giving him light work for the first 12 months; on no account making him pull very heavy weights. Make the hours of work as regular as possible, about four hours a yoke being long enough. Never work mares in foal in the shafts of a wagon. Equalise the work on the farm so that the horses are working nearly all the year round. Do not keep more

horses for work than you can provide work for, as they are expensive animals to keep. Do not keep horses shod for ordinary farm work unless it is absolutely necessary. Keep their feet trimmed properly, so that they do not break or get out of shape. In turning, if great care is not exercised, the horses will tread on one another, thus causing sidebone, and other injuries, more especially if they have shoes on. Be kind to the horses, but let them know that you are master." In discussing the subject, Mr. Miller strongly opposed the writer's ideas in the matter of breeding from different types or breeds, and favored keeping the breeds pure. Mr. Giles thought that it was very important to breed only from mares and sires that were good tempered. In the Far North mules were used for mail-carrying, &c., and they stood long journeys better than horses, on less feed; and for dry, rough country they were extremely useful. Mr. Langford agreed with the writer in regard to feeding partly on cocky chaff, bran, &c., stating that his horses were very healthy when fed on that class of feed.

STOCK AND CROPS.—Stock in the district were doing remarkably well, and the crops were reported as looking much better than had been the case for many years.

Port Elliot, October 19.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. H. B. Welch (chair), J. McLeod, H. Green, J. F. Vince, W. E. Hargreaves (Hon. Sec.).

CULTIVATION.—In a paper on this subject the Chairman stated that during the past year, which was a somewhat exceptional one, he had not experienced trouble with too much moisture in the soil. Nevertheless, the crops were not as good as they should have been, and he attributed this to the cold nature of the soil. It was therefore necessary to discover the cheapest means of putting warmth where it was wanted. His experience was that super. was rather disappointing, as the extra results obtained by its use did not compare favorably with those secured on northern land, where only about 14in. of rain fell annually. Bonedust was better, but it was rather expensive, and stable manure was limited in supply. Lime and salt had been mentioned as excellent dressings, and he had no doubt that if these could be obtained cheaply and added to the soil, they would be of considerable benefit to it. Rotation of crops was perhaps one means of bringing about the same result, peas especially being an excellent crop to improve the soil, and in addition to provide excellent fodder for stock and lambs. He had tried experiments on three and a half acres of land, consisting of a rich black alluvial soil. In the first week of July, 1909, the paddock was drilled in with field peas at the rate of 1½ bush. to the acre, together with 1cwt. of guano super. per acre. At the end of January 55 lambs were put on the crop, and although they were stores at the time, at the end of six weeks they were in prime condition, and were sent to the Adelaide market, where they realised a good figure. At the end of March the pea straw was raked up and the ground was ploughed dry and sown with a mixture of wheat and oats, which germinated at the end of April. During June 29 store lambs and wethers were put on to the green feed, and they fattened very quickly. At the end of July the paddock was fed down bare, and then ploughed up, and on the 1st August sown with Marshall's No. 3, with 1cwt. of wheat manure to the acre. On the 1st of Jan. it was reaped, the plot yielding 25 bags. In June it was again ploughed and sown with peas at the rate of 1½ bush. to the acre, together with 1cwt. of guano super. This crop was harvested and yielded 40 bags of peas fit for market, besides several bags which the sheep picked up. Early in June the following year the ground was ploughed and cross-drilled with Le Huguenot wheat at the rate of 1½ bush. to the acre, and a dressing of 1½ cwt. of bonedust applied. This crop grew to a height of nearly 6ft. and returned 15 tons of hay from three and a half acres. At present the paddock was carrying a crop of oats which looked well, and it was his intention to put in a crop of peas next year. Fallowing had given good results in the district, as it killed the sorrel and seemed to sweeten the land. A small plot of one and a half acres which had been nearly covered with sorrel was well worked and sown with oats and lucerne early in March. There was sufficient moisture in the soil to germinate most of the seed, but the long spell of dry weather killed the greater part of the lucerne. When rains were experienced the oats came away well, and the result was that a heavy crop which he had been cutting for two months, was providing feed for seven horses and three cows, and there was still half the area to be cut. Although fallowing might not be profitable every year, he felt certain that in ordinary seasons it would pay. It was more profitable to grow hay in this district than to reap grain. Peas, lucerne, and other fodders for dairy cows would be found profitable crops, and potatoes, onions, &c., would be well worth a trial. In discussing the subject members generally agreed that lime could be profitably applied to the soil in the district, especially in the hills.

Strathalbyn, October 29.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. J. W. C. Fischer (chair), J. C. Heinjus, M. G. Rankine, E. Hall, J. Knight, T. Collett, F. S. Traeger, J. R. Rankine (Hon. Sec.).

BREEDING DRAUGHT HORSES.—Mr. E. Hall read the following paper on this subject :—“When breeding draught horses the first essential is to select a good brood mare, with a well-shaped head, roomy, possessing good flat bone, a well-shaped body, and standing well on her legs. Plenty of good quality hair, well placed, is also advisable. The color of a horse is important. Brown, bay with black points, and black are the best. Mares of these colors generally have better shoulders and feet, and are more easily kept in health. It is generally advisable to select a stallion of one of these colors, and the best animal procurable. The high-price horse is the cheaper in the long run. If cheap and inferior horses are bred from one may get a foal that will return £15 or £20 as a three-year-old, but if heavy draughts, with plenty of bone and hair are patronised there is a ready market for foals at from £35 to £45. If the mare is deficient in hair or in the quality of hair, she should be mated with a rough, coarser horse, and when the mare is inclined to be leggy, she should be mated with a low-set, thick-built stallion. A great deal can be done towards improving the draught by noting the weak points in the mare, and mating her, if possible, with a stallion which is particularly strong in those points. The strong or heavy draught is the most profitable, but another useful class can be bred by mating a roadster mare with a thick-set pony. From these a good suitable single-harness horse will be obtained. One of the hardest classes to breed suitably is the pony. There is a great demand for well-shaped strong ponies. There are hundreds bred, and not more than 20 per cent. are of the right stamp. It seems that in all classes the same thing applies. Breeders seem to be afraid of getting their stock too big, and so the tendency is for the breeds to degenerate and become weedy.”

Willunga, November 9.

(Average annual rainfall, 25½in.)

PRESENT.—Messrs. Pongilly (chair), Binney, Blacker, Waye, and Hughes (Hon. Sec.)

LAMB-BREEDING.—A discussion on this subject took place. This had become a profitable “side line” on the farm of late years, and experiments were being conducted each year with a view to determining the most satisfactory breeds to use. The Lincoln-Merino ewe was generally considered the best, but opinions were divided as to what ram to use. The Dorset Horn would produce a large quick-growing early-maturing lamb, but it required an abundance of good feed. It was a prolific breeder also, twins often occurring. For hillside pasture land Mr. Binney had found the Southdown most satisfactory. The Shropshire had its admirers, and some high quality lambs of this cross were sent off every season. The Leicester had also been tried with good results. The chief factor every breeder admitted was the feed. To grow good lambs plenty of feed was absolutely essential; without it the best cross would give indifferent results. The Chairman reported that he had fattened 180 sheep on the experimental feeding off plots—18 acres and 14 acres of pasture land—since August, and some of the sheep were in low condition when turned in.

SOUTH-EAST DISTRICT.**Keith, October 22.**

PRESENT.—Messrs. Morcom (chair), MacIntyre, Thompson, Godlee, Dall, Packer, Orr, Pearson, Hutchings, Redpath, Fulwood, Williams, Lushman, Lock (Hon. Sec.).

FALLOW.—The following paper was read by Mr. Dall :—“Fallowing should be started as early as possible after seeding, and it should be pushed on with all speed, while there is moisture in the ground. The depth of ploughing should be determined by the nature of the soil. Some land will stand 8in. or even 10in., while in other cases 3in. is quite sufficient. This depth should do in the case of stony land, as deep ploughing has a tendency to turn up the stones. Over gum or stony land it is advisable to use the ordinary bridge plough, and it should be run to a depth of 3in. or 4in., turning everything, and taking particular care to plough the headlands. Where new land is to be treated and it can be worked early in the spring, rape should be a profitable crop, but on old or dirty land,

fallow will be found more profitable. Land of the latter class cannot be ploughed too early or worked too often. The best method is to skim over the stubble to a depth of about 1½ in. after harvest, then by the time seeding is finished there will be a nice sward of weeds to be turned under. This can be done by ploughing to a depth of 3 in., which should be followed by an application of the harrows to give the seed every chance of germinating. When working back fallow, it is advisable to use the skim plough, except in the case of spring working, when the cultivator can be used to advantage. The best implement for mallee or heathy country is the disc. This will cut most of the shoots, and when there are not too many stones will also cut out about 80 per cent. of the small yacks. The heathy country should be ploughed to a depth of about 10 in., and this should be done at least 12 months before sowing, which will give the roots and rubbish a chance to rot. Cross harrow well and let it remain until seeding time, when it should be cultivated before the drill and lightly harrowed after." In discussing the question members generally agreed that deep ploughing was advisable, provided too many stones were not pulled up.

Mount Gambier, November 9.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. A. J. Wedd (chair), D. A. Collins (Hon. Sec.), and 10 members.

BREEDING AND FATTENING PIGS.—Mr. J. H. Buck read the following paper:—"At present there are far too many inferior breeds of pigs about. I prefer pure-bred Berkshire boars, as they are fast growers and good doers, and the easiest to keep fat. In selecting a sow for breeding get a long-bodied animal, and pick it from a large litter, but not from an old sow, as they generally grow weedy and go back if put too often to the same boar. There is nothing that goes back so quickly in breeding as the pig. I have seen sows with litters in which two or three of the young pigs showed different breeding altogether. Providing there is a good milk supply and feed can be grown, there is nothing more profitable than raising pigs. The price of this stock at present is a record one, as there is a marked shortage of bacon in the Commonwealth, and prices are higher than they have been for some time. Each sow should be looked upon as capable of providing two litters of eight per annum, and at the average price of, say 12s. 6d. per head when seven or eight weeks old, these will bring in a sum of £10 per sow. Last month I sold 21 suckers, and they averaged 17s. per head. If fattened they must be ready for market in from five to six months and they should then weigh 160 lbs. to 170 lbs. They will then bring £2 15s. to £2 17s. 6d. per head in the local market. If there is any sow on the farm not paying, fatten her, and then place a young sow in her place. When fattening, keep the pigs in a small sty and do not allow them to roam about. Keep the sty clean, and when feeding do not give too much at a time; it is better to feed them three or four times a day; they will then clean the trough and do better than if the trough is filled. I generally fatten on peas and milk, sometimes on Cape barley. Cape barley fattens very well, but malting barley is very slow. Grain must be crushed, or the pigs will waste too much. The best way to give peas to pigs is to stack them alongside the sty and cut a piece down with a hay knife and throw it into the sty, straw and all. The pigs then have no chance of bolting their food; they will find every pea, and the pea straw will serve as bedding. When the little pigs are about three weeks old they will usually begin to notice their mothers feed. Then is a good time to make a separate pen for them with a creep hole to it, so that they can get in and eat without being disturbed by their mother. Separator milk and a little crushed corn is about the best thing to start them on. Soaked corn will also be eaten readily, but there is nothing that is quite so satisfactory as this time as milk; when the pigs are fed this way it gives the mother a good chance to keep up in condition. When a sow has a litter, care must be taken not to overfeed her the first day or so, or she will lie on the young ones. Do not give too much bedding at a time, and it must consist of short straw, so that the young will not get tangled in it. After three or four days give them plenty of straw to keep them warm and clean, as they will not do well in a damp or dirty sty." In reply to the Chairman, Mr. Buck advocated breeding from young sows, so mated that they would have their first litter when they were about ten months old. If they were properly fed and looked after that was not too young. He had not had experience in cross-breeding. He had kept Tamworth and Yorkshire pigs, but found that in the system he went on, viz., that of selling the young ones, the pure Berkshire was best. He did not believe in the pure-bred stock for common breeding, as the litters were not large enough. For fattening he would say get cross-breeds. Four years ago he purchased four white Yorkshire sows, and one of them had a white Yorkshire litter, but his customers did not like them. He found the same objection

to a crossbred Tamworth litter. The Tamworths would do if they had a large area of rough country over which to range, but they were very slow in growth. If sows were mated with the same boars too often there was a tendency for the progeny to go back. Some young ones would outgrow the others of the same litter very much. Some seemed to be weedy. Fruit-fed bacon was good. Bacon fed on apples was very sweet. Pigs would not fatten on fern roots, but they would keep alive. The Tamworth was the breed for ferns. The Chairman said pigs would do well on apples and make good and sweet bacon. His practice was to feed them on apples and he topped them off with a bushel or two of dry wheat.

Penola, October 5.

(Average annual rainfall, 26½ in.)

PRESENT.—Messrs. D. O. Fullerton (chair), L. W. Peake, A. H. Strong, L. L. Norman, J. Alexander, T. Yeates, J. F. Warner, D. Adamson, F. R. Field, E. F. McBain, and S. Oakley. (Hon. Sec.).

MAIZE AND CHOU MOULLIER FOR SUMMER FEEDING.—The following paper was read by the Hon. Secretary:—"It seems to me that the small amount of fodder crops grown in this district is not due to the difficulty of growing such crops, but to the labor entailed, and, in some cases, the difficulty in turning them into money. A crop of fodder, with the exception of hay, cannot be sold off the farm like wheat, oats, or barley, but extra knowledge and labor are required in the purchasing and feeding of stock, per medium of which the crop is made payable. The use to which nearly all the green stuff grown in the district is put, is to provide a little extra feed for the few cows that are kept as a sideline on nearly every farm, the result being that not much trouble is gone to to provide the feed, causing low yields and often a certain amount of condemnation of fodder crops.

Wherever the climatic conditions are such as to allow of successful summer forage crops, such as maize and lucerne, being grown, winter-grown cereals take a back seat; and in such districts the land is invariably dearer than wheat-growing land. It seems evident, therefore, that a greater return per acre can be obtained from fodder utilised on the farm than from grain. In view of the fact that the summer rainfall in this district enables highly satisfactory forage crops to be grown, why is it that the practice is not more resorted to? The reason is that the capabilities of the local soil in this direction have not yet been fully realised, and I feel sure that the area of cultivated summer crops will be enlarged every year. Chou moullier and maize can safely be relied upon to give large yields of feed, provided they receive proper treatment, which may be set down as deeply-ploughed well-worked soil, free of weeds and inter-cultivation of the rows while the crop is growing, the main object being to retain the moisture in the soil; the next important item is thin sowing. For maize, 3ft. between the rows and an average distance of 16in. or 18in. between the plants will be found to be by no means a thin sowing, 9lbs. of seed per acre being ample. With chou moullier one plant to the square yard will give most satisfactory results. It is a surface feeder and a very rapid grower; when fully grown it reaches a height of 4ft. or 5ft. with an abundance of very succulent leaves about 1½ sq. ft. in area. The leaves can be fed to cows without any danger of the milk being tainted. The stalk is thickest half-way up, tapering off at the bottom, while at the top it branches out into two leaves. When leaves are pulled off no more grow in the same place, but the two at the top of the stalk soon grow to full size, when the stalk throws out two more above these which can then be pulled. This habit of growth from the top necessitates pulling the leaves and hand feeding stock; because if allowed to graze on it the stock eat off the top, thereby giving the plant a severe check. When the top is cut or eaten off several shoots sprout from the butt, though they do not make such rapid growth as the two top leaves, and it often takes a long time before the butt sprouts. The stem is covered with a soft bark of which sheep are very fond, and inside is a pithy substance which looks and smells like the flesh of a turnip. This should not be fed to milking cows, as it taints the milk, although they will eat the whole stalk readily enough, if it be not too old. Sheep often eat the stalk right through, which causes the plant to fall and often remains uneaten, as the stalk seems to be preferred to the leaves. A great weight of fodder can be taken from an acre of well-prepared ground, in which chou moullier plants are transplanted 2ft. 6in. each way, about September, and the rows horse-hoed (till the plants become too big to allow it), and the bottom leaves pulled as they attain sufficient size. Such a method entails so much labor that it would only pay to feed it thus to dairy cows. To those who keep a small herd of eight or 10 cows as a side issue on the farm an acre or two would prove highly payable. It would supply the additional green feed all through the summer and autumn, and would mature the following summer, as it is a biennial. Treated in the

above manner 50 to 60 tons per acre (stalks included, as they are edible, and, if stored away with the leaves cut off, will keep for several months) can be obtained. Moreover, the attacks of aphids have very little effect on it and I have never seen a plant destroyed thus, although rape plants were completely destroyed within a fortnight from the time of their being attacked. It is even more drought-resistant than maize, and receives a lot of moisture from the air. It has no tap root, and has a wonderful capacity for condensing the moisture in the air on the leaves, and the drops trickle down the stem of the leaf into the stalk of the plant, as is the case with maize. Maize can be planted and utilised with best results in far bigger areas, and, in my opinion, it should replace the few bare summer fallows seen throughout this district, as the need is not to conserve moisture but to clean and aerate the soil, preparatory to the following season's cereal crop. The size of the holdings cultivated here does not allow of any ground remaining idle, even for a short period. Deep ploughing and fineness of tilth are never labor in vain with a summer crop, and, combined with thin sowing, will never result in a poor yield of maize forage. For September planting, a good variety is Longfellow, which stools out very well with much leaf and a succulent stem, although it has not attained a great height in crops that I have sown. It grows quickly and is cobbled and ready for feeding by January. It is a good variety for grazing with sheep. For October and November planting Eclipse and Hickory King do very well, cobbing heavily about February and in March in a normal year, and reaching 7ft. to 9ft. in height, with much bigger cobs than Longfellow. It is absolutely imperative to sow thinly, and be sure that good bright seed of an even large size is used. This shows that it comes from the centre of the cob; at each end of the cob the seed is smaller and not so suitable for planting. Plant the seed by hand, broadcasting the manure; using a hundredweight of prepared fodder manure, which has a marked improvement on the yield, in the furrow with the seed. Sowing through a drill by mixing the seed with the manure and closing the required number of the drill shoots should suffice if a large area is to be put in. The horse-hoe should be used two or three times while the plants are growing. It is advisable to plant a field at intervals of three weeks from September till November, so that the different plots will mature in succession. When the first plot is ready, a barb can be run between the first and second plots and cows turned in to graze it. Although they will eat the cobs first they will afterwards eat the stalks. This method is not so good as cutting and feeding to cows. However, it saves the labor of cutting and carting, and the cows do not knock each other about and spoil the food as they do when hand fed without suitable stalls. Do not turn stock on to maize until the cob is formed, because, until then it has very little feeding value, and unless very hungry, stock will not eat it, because it does not contain anything like the quantity of sugar then as it does when the cob is in the milky stage. Moreover, I believe one good stalk carrying two large cobs is better than 100 spindly stalks with stunted cobs, the result of thick sowing, and it has to be a very thick stalk that cows won't eat, unless they have a quantity of other feed to enjoy, when, of course, there would be no need for maize. By itself, it is an incomplete food for dairy cows, as it does not increase the milk yield to any extent, compared with the amount of food eaten, unless the cows were poorly fed previously. It requires to be supplemented by other foods rich in protein, such as lucerne or bran or the dry trefoil and clover in the stubbles. Horses eat green maize even more readily than cows, and it fattens them rapidly. It is advisable to grow it for that very reason, as the workers could be got into tip-top condition before ploughing commences, when it will be easier to keep them in good fettle all through the winter. Sheep also are very fond of it, and I have often read that ewes, if fed on green feed during mating season, are far more prolific. Such being the case, there is no more profitable crop for the many sheep-farmers to grow, especially those with light loamy land, such as yacca country, which is eminently suited for maize. The September planting can be fed by the beginning of January, and the November planting as late as May in a normal year. I feel confident maize will prove an important forage crop in the farm rotation. It leaves the land equal to a well-worked manured fallow, as the produce is all returned to the ground and not sold off the farm." Mr. Adamson approved of well-worked soil, and said that the prevalent idea that maize could not be grown if planted later than October was wrong. About the best maize crop grown in the district last summer, which was very dry, was planted in late November and early December, on ground twice ploughed a month or two previously and well worked. The seed germinated well and the resultant crop averaged about 7ft. high with large well-filled cobs. The horse-hoe was used once or twice. Mr. Norman said that land here was fairly well off for feed in summer: a winter fodder plant was needed. Mr. McBain spoke highly of *Phalaris commutata*, which had eclipsed the results obtained by him from lucerne. A very few plants of chou moullier had enabled Mr. Field to keep a milch cow in splendid condition.

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Diseased Beans.

Specimens of broad beans affected with a disease, through which the leaves and pods become brown and apparently wilt off, to the serious detriment or loss of the crop, have been submitted to the Professor of Botany (Prof. Osborn, M.Sc.). He reports as follows :—" I am of opinion that the disease is caused by a bacterium, and that it probably is *Pseudomonas phaseoli*. This organism is stated to cause a bean blight in U.S.A., and, I believe, it also occurs in England. Control is stated to be difficult, and must concern itself in the seed selection and crop rotation. Seed from an infected patch should not be sown, though it looks healthy. The disease is stated to occur in the early stages of the host, but not to become evident till the pods form, as a rule."

Bee Scouts.

Commenting on the letters appearing in the December *Journal* from Messrs. F. A. Joyner and T. E. Whitelaw, in reference to bee scouts, Mr. C. Hinze, Lochaber, writes—" I have kept bees for many years and have made a close study of their habits. My apiary is situated half a mile from my house. About 8 a.m. one day in November I noticed about a handful of bees at the house among some hives stored in a shed. I walked up to the apiary and saw the bees shaping for swarming. As it was a good hive I watched the swarm leave the apiary and followed them to the shed, where they entered a vacant hive and are still there. I have also noticed stray swarms that have hung overnight on shrubs and have taken them, but to keep them it is always necessary to shift the hive at once. If the scouts come back before the bees are in the hive they will clear to the place chosen for them by the scouts. I have noticed that happen several times, even when some brood comb has been put in to keep them."

A Dangerous Weed.

Mr. J. M. Black writes—" When speaking before the Agricultural Bureau Congress in September I took the opportunity of warning farmers and others against the European bindweed (*Convolvulus arvensis*), which has appeared in South Australia during the last few years, and is spreading rapidly outwards from the city. Among the plants sent by the Morchard Bureau for identification was one which consisted of nothing but a few roots and a couple of leaves. I planted it in my garden to see what

it might be. A week or two ago (*i.e.*, early in December) it had grown so rapidly that there was no doubt of its being bindweed, and I at once dug up every scrap of it; for the smallest piece of root, if left in the ground, will form a new plant, and few weeds are more difficult to eradicate. This proves that the bindweed has got much farther north than I thought, and unfortunately it can accommodate itself to a dry soil as well as to a moist one. Professor Ewart, in his 'Weeds and Poison Plants of Victoria,' says—'The weed is especially troublesome in light, friable soils, and in corn crops. Badly-infested land should be deeply ploughed and the underground stems harrowed or raked out. When patches are present they should be forked out. . . . The leaves are bitter, the underground stems purgative, and the seeds (four in each rounded capsule) are poisonous to stock if eaten in any quantity.' I may add that *Convolvulus arvensis* has been proclaimed a noxious weed in Victoria."

Commonwealth Wheat Harvest.

According to forecasts published by the Government Statists of the various States, an aggregate yield of 79,097,270bush. is expected for the whole of Australia, against 71,636,347bush. in 1911-12 and 95,111,983 in 1910-11. Crops of the various States as officially forecasted compare with final estimates for the two preceding years, thus—

	1910-11.	1911-12.	1912-13.
	Bushels.	Bushels.	Bushels.
South Australia	24,344,740	20,352,720	20,137,870
Victoria	34,813,019	20,891,877	23,144,500
New South Wales	27,913,547	25,088,102	24,365,000
Western Australia	5,897,540	4,358,904	9,389,900
Tasmania	1,120,744	659,156	1,260,000
Queensland	1,022,373	285,109	800,000
Total	95,111,983	71,636,347	79,097,270

Australian Butter.

In his report to the Minister, dated London, November 15th, the Trade Commissioner, referring to the butter market, states—"There is a very large amount of cold store still on the market; but I understand great difficulty is being found in making sales at a considerable reduction on ruling prices. The arrivals for the week are about 20,000 boxes. Most of the agents are doing their best to maintain the price, as the majority of them are interested in the large quantity of cold stored butter, a great deal of which has been

put on the market as fresh shipments. This, to my mind, is dead against the interests of the Australian butter trade, and some measures should be taken to prevent this being possible. The fact of so much stale butter being forced on the market, and so many cases represented to be fresh arrivals, gives the small storekeeper in particular a very poor idea of Australian butter. There is no doubt that it is due to this fact that the consumption of butter in England fell off last year by 30 per cent. It can easily be believed that the retail buyer would sooner have really good margarine than some of the stuff that is now being offered to them as Australian butter. I am collecting a considerable amount of data in connection with this subject, and it is my intention, when I have finished with the exhibitions for this year, to write you a very full report in regard to it."

Colonial Meat as English and Foreign.

In the course of a recent sitting of the Dominion's Royal Commission, a deputation was received from the Incorporated Society of Meat Importers regarding the condition regulating the importation and sale of meat supplies from Australia and New Zealand in competition with meat from foreign countries. Messrs. W. Blankley, G. Anderson, and E. H. Robinson, members of the Council of the Incorporated Society of Meat Importers, said that at present meat from Australia and New Zealand was classed in this country as "foreign," and was therefore subject to all the prejudice against foreign meat. They were of opinion that an international label, or Empire trade mark, duly adopted by Australia and New Zealand, if approved and enforced by this country, would greatly assist the sale of Empire-grown meat. Under the present system Australian and New Zealand meat had to be sold in competition with the large quantities of meat imported from foreign countries, and there had been frequent complaints of substitution of inferior and cheaper meat. Prosecutions by Agents-General had more than once been instituted without bringing conviction, owing to the absence of any proper regulations and inspection in this country. Unfortunately, Great Britain was the only civilised country that had no organised Government—as distinct from municipal—meat inspection. Questioned as to the substitution of Australian or New Zealand meat for English by retail butchers, one of the witnesses said that it was not at all an uncommon practice in the West End of London for the best joints of the best Canterbury (New Zealand) lamb to be sold as English at the highest English prices. Pressed to say whether there was any substantial proportion of New Zealand lamb sold as English, the witness said that the proportion was not very great—perhaps $\frac{1}{2}$ per cent. on a total import of 2,000,000 carcasses, or equal to 10,000 carcasses a year.—*Mark Lane Express*.

The World's Largest Grain Bin.

Reports received by the Canadian Northern Railway Company in the middle of November showed that there was then more grain in the elevators in Western Canada than was stored there at the same time in the previous year, and this, notwithstanding the railways were at the time handling the grain as rapidly as it was being received. The Grand Trunk Pacific grain elevator, on the Mission Terminal at West Fort William, will have a total capacity of 5,750,000 bush., making it the largest grain bin in the world.

Nitrogenous Substances on the Farm.

Nitrogen is the most costly ingredient in fertilisers, and every effort should be made to restore all kinds of waste nitrogenous material to the soil. Vegetable and animal refuse should be carefully preserved on the farm, and after being allowed to rot, should be applied to the land; and while it is advisable to burn noxious weeds, such as twitch, in order to prevent their growth, vegetable substances should, as far as possible, be ploughed in, in order to increase the supply of organic matter in the soil. Green manuring acts in this way; the crop by its decay enriches the soil with organic matter, at the same time that it restores the mineral substances and nitrogen taken up from the soil during its growth. This restored matter in the crop residues is often more easily assimilated by the following crop than the same materials left in the soil. At the same time the activity of the nitrogen-fixing organisms present is enhanced by the addition of the carbonaceous materials.

Weaning the Foal.

The hardest thing to overcome in weaning foals is the actual loss of the companionship of the mother, which causes the colt to worry and fret. Horses are nervous animals, and the colt, being deprived of his "best friend," often spends much time in running up and down his paddock or stall neighing, pawing, and whinnying in a vain effort to find an escape which may lead at least to company of his kind, if not to his mother. To take the place of his dam the best possible substitute is another colt. If the owner has two colts of the same age, little difficulty from fretting is likely, as they can be turned together, and the presence of another colt seems to drown their trouble to a great extent. If a colt of his own age is not available, use a yearling or two-year-old, but arrange the feeding so that the weanling gets his share of the feed given. For the best results it is necessary to keep the foal which is being weaned out of sight and hearing of his dam, as every time they see or hear each other only serves to prolong the period of fretting by reviving their memories. The main point in the weaning, all things con-

sidered, is feeding the colt. On no account stint the feed. Give all he will eat up clean, but do not keep the manger full of stale hay or stale oats. Just feed that amount which is readily eaten before time for the next feed. There is nothing better than crushed oats with a little bran added, and some authorities advocate a little boiled linseed. Start the colt on a small quantity of grain, and increase it as his appetite warrants and as colder weather approaches. A little clean, sweet milk can often be used to advantage at weaning time. It is well to commence with whole milk.—*Mark Lane Express*.

High Prices for Irish Shorthorns.

Some high prices were obtained recently in the Argentine for pure-bred Shorthorn bulls bred in Ireland. The three top prices paid were—Prince Augustus, sold by auction in Ireland for 110 guineas, and realised in the Argentine £3,834; Dunmore Pearl, sold by auction in Dublin for 105 guineas, brought in the Argentine £1,818; and Cascade, sold in Dublin for 80 guineas, realised £1,454.

Grants to Russian Agricultural Machinery Works.

The *British Board of Trade Journal* states that the Russian Ministry of Commerce has provided in its estimates for 1913 for the expenditure of 750,000 roubles (about £79,000) in bounties to Russian manufacturers of agricultural machinery. The chief grants are intended for the Linberets Works near Moscow (the newly established agricultural machinery works of the American Harvester Company), which propose to turn out from 7,000 to 10,000 reapers and from 2,000 to 4,000 sheaf-binding machines during 1913; for the Maltsoff Works for a proposed output of 350 portable engines; for the Aksai Works at Nakhevanon-Don for a proposed output of 5,000 reapers with self-ejecting apparatus; and for John Grieves & Company's Works for a proposed output of from 3,000 to 4,000 similar machines. In addition to these, the Ministry anticipates that some of the locomotive and wagon works, for want of orders for their usual manufactures, will turn their attention to portable engines and threshing machines.

Turnips for Dairy Cows.

A report has been issued by the Edinburgh and East of Scotland College of Agriculture, says the *Agricultural Gazette*, on experiments, the object of which was to test the effect of a ration consisting largely of roots on the yield and composition of milk, and incidentally to determine how far turnips

could profitably replace the more concentrated and expensive foods commonly employed in feeding dairy cattle. The conclusions drawn from the experiments are these:—The feeding of a ration containing a large quantity of water does not increase the percentage of water in the milk or reduce the percentage of fat. In all three experiments the greater yield of milk was obtained from the cows on the concentrated ration. On the other hand, the milk from the cows on the turnip ration contained a higher percentage of fat, and a greater total weight of fat was secreted in the milk. The cost of production, when allowance was made for the percentage of fat in the milk, was less in the case of the turnip ration. At the end of the experiment the condition of both lots of cows was satisfactory. While the milk of individual cows frequently contained less than 3 per cent. of fat, the percentages of fat and of “solids not fat” in the mixed milk of both lots practically never fell below 3 per cent. and 8.5 per cent. respectively during the course of the experiments.

Forests in Siberia.

Siberia contains half the forests of Asia, but it is impossible to estimate their total value, as great tracts are as yet unexplored. A large part of the forests belongs to the State. According to official figures, 228,189,148 acres are under Government control, and the extent of forests in the Amur and Maritime provinces is estimated at 509,000,000 acres. The State is gradually acquiring new forests as they are discovered. The best kinds of timber are red and white cedar, yellow pine, oak, and ash. Eastern Siberia and the Island of Sakhalim (the northern half of which is Russian) produce the best wood for pulp.

Horse Meat in Paris.

In 1845 the sale of horseflesh was officially authorised in Munich, and regulations for the industry were instituted, and by 1855 it had been legalised throughout Germany. In France the first horse butcher's shop was opened in Paris in 1866. The present widespread use of horse meat in that country dates, however, from the siege of Paris. During the terrible winter of 1870-71 Parisians of all classes were forced to adopt this article of diet, which was facetiously named “siege venison”; as many as 65,000 horses were eaten during the siege, and people learned to accept horseflesh as a tolerable substitute for other kinds of meat. At the present time there are about 200 horse butchers' shops in Paris, and horseflesh constitutes about 5 per cent. of the meat eaten in the city. It now costs about half as much as the corresponding cuts of beef.—*Agricultural Gazette.*

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

DRYING WILLIAMS' (DUCHESS) PEARS.

"P. S.," Tanunda, asks—(1) At what state should Duchess pears intended for drying be when picked? (2) Should they be sulphured, and if so, what quantity should be used for 18 trays 3ft. x 2ft.? (3) How long should they remain in the sulphur box? (4) Should the fruit be peeled, and quartered, or halved?

Reply—The fruit should be quite ripe, that is, fit to eat, before being cut and spread to dry. They are therefore gathered at the usual stage of maturity and ripened in store. They are prepared in different ways. Some merely halve the pear and remove the stalk and calyx. Other do this and remove the core as well. Others again peel, core, and remove stalk and calyx. The removal of stalk, calyx, and core is recommended, but unless for very choice samples the skin may remain on. Up to the present pear dryers have not limited the quantity of sulphur, and have kept the fruit confined in the fumes for 10 to 12 hours. This, however, should be made a matter of experimentation, as if the white color can be secured by sulphuring less, all the better.

SUCKING CALVES.

"J.N." asks how to prevent calves sucking each other.

Reply—The craving of calves to suck each other is partly due to the want of saliva. This is especially noticeable where a large number of calves are confined in a small yard. Such a habit is detrimental to the youngster, inasmuch, in some cases they attack the navel, thereby causing rupture. Persistently sucking the teats tends to abnormally swell that part and lead to udder troubles at a later period. This habit should be prevented by keeping the calves separated. Feeding by means of the indiarubber teats, and giving the calves some bran and grain immediately after receiving their milk will lessen the trouble. The application of aloes on the teats when the practice is first noticed will check the desire of the calves to suck.

SOFT-SHELLED EGGS.

"J.E.L.," Davenport, states that several persons in his district who keep White Leghorns complain of their laying eggs with very thin shells. The writer keeps in his fowl yard a heap of mortar containing plenty of lime, and a plentiful supply of shells and charcoal, but the shells of the eggs are so thin that they are useless for sitting purposes.

Reply—The laying of soft-shelled eggs, or eggs which are deficient in shell, is frequently caused by an overfat condition of the birds. Give as much green feed as possible, such as lucerne, and use Epsom salts in the drinking water; say, one packet dissolved in sufficient water for 20 adult fowls. Under some conditions poultry do not derive as much benefit as they should from the mortar, sea shells, &c. The feeding of fowls is an important matter.

COLOR OF MILK AND BUTTER-FAT.

"R.P.," Gawler, asks—Is the color of milk a good guide to its fat contents.

Reply—Correctly speaking, the color is no true guide to the value of its fat contents. The coloring matter of milk is called lactochrome. The character and breed of the cow, as well as the food fed to the cow, affect the color of the milk.

STOCK INQUIRIES.

(Replies supplied by Mr. F. E. Place, M.R.C.V.S., B.V.Sc., Veterinary Lecturer).

Swelling on Horse's Shoulder.

"A.B.," Davenport, has a horse which has a swelling on the shoulder above the hame hook; there is no lameness nor discharge. He asks for advice as to treatment.

Reply—The swelling is probably a serous cyst, arising from the jar of draught. If recent it would be advisable to bathe well with hot water, and then to open with a sharp knife at the lower part; but if old and hard, probably it would be better to dress it daily for a week with oleate of mercury, 10 per cent.

Warts on Cow's Teats.

"F.R." Forest Range, wishes to know how to remove warts from a cow's teats.

Reply—Generally castor oil applied daily, after milking, will do this. Sometimes it is advisable to apply strong vinegar in the morning and the oil in the evening. If these do not succeed, tincture of thuya, 10 drops to a tablespoonful of water, applied daily, will remove them.

Sudden Loss of Condition.

"A. S.," Snowtown, writes that a five-year-old mare that has been working regularly and doing well, suddenly shows a harsh coat and sluggish eye;

she seems to eat and drink fairly well, but loses condition on first class green feed, and is tucked up and stiff.

Reply—The symptoms are too general to enable one to hazard a guess at the ailment; it might be due to bots, but more probably she has caught a cold, and the lining of the chest and possibly the lungs are somewhat affected. It might be well to let her have half an ounce of Fowler's solution of arsenic in her food twice a day for a week, then once a day for a week, and then once every three days for five times. If she is not getting any manger feed in which to give it, it might be mixed with a little molasses and put on the tongue or back teeth.

Replying to various inquiries, Mr. Place states—

Castration of Colts.

Colts are generally operated on at a year old, but the operation can be done at a few weeks, after which the testicles are drawn up again and the operation must be postponed till they are sufficiently developed to allow of a good grip of them. The essential part of castration is the safe removal of the testicles and the stopping of bleeding from the artery in the front part of the cord. It is most convenient to throw the animal on the near side and draw up the off hind leg and secure it near the shoulder. The near cord just above the testicle is grasped firmly in the left hand, drawing the skin tight over it. A good bold cut right down on to the stone is made with the knife in the right hand well forward and near the middle line between the thighs; while this is being done the cord must be held firmly to prevent the stone being pulled up into the belly. As soon as the colt ceases to pull the knife is pushed through the cord, and the hind or-muscle part is cut through; the stone will now hang limp and cannot be pulled back. It should now be firmly but gently pulled free of the inner skin, and twisted a few times before being crushed off by the emasculator, which is the instrument most commonly used now. If the hot iron is applied, the clamp should be well greased to prevent sticking. The off stone is treated in the same way; the cords are well pushed up and the skin pulled well down over them to prevent their sticking to it or hanging out, and lard, oil, or any antiseptic dressing smeared over the purse, before the animal is let up. One reason why the emasculator is blamed for the swelling that sometimes follows its use is that the outer wound heals too quickly; this should be opened if necessary. Emasculator, knife, and hands should be cleaned before and after the operation in water that has been boiled, and which contains washing soda, an ounce to the gallon.

Male Fern Treatment for Fluke.

The best preparation for the purpose is ethereal extract of male fern, and it may be given to the sheep in two or three tablespoonfuls of milk, or better,

enclosed in a gelatine capsule. The dose for a full-grown sheep is a dram, or 60 drops, and less in proportion for younger ones. The expense and trouble of the treatment are against its general adoption, but it is well worth a trial on small lots and in badly affected districts. The sheep must be yarded over night and kept without food, and the drug given in the early morning. The sheep may be let out after a couple of hours to graze, and brought to the yard in the evening again, as the dose has to be given for three consecutive mornings. This is generally sufficient, but in some cases it has to be repeated once a week, one dose only, for a few weeks. Of course the usual preventive treatment of iron and salt and selection of paddocks must receive attention. After using the male fern, it is well to kill a sheep to observe whether the flukes in the liver are being killed by it.

Spaying Cows.

Spaying should be done when the cow is in her prime and giving the greatest flow of milk; she should be in good health and fair condition, not too fat or very poor; she should not be on heat, and preferably not in calf. The operation is done in one of two ways—either through the flank or through the bearing (vagina). In the flank operation the animal may be either standing or down; if up, she should be held against a wall or gate and her legs tied to prevent kicking. An up-and-down cut is made in the left flank about the middle of the upper part of the V which shows when the belly is empty; lower down there is risk of cutting an artery. The cut goes through the skin and muscles till the glistening lining of the belly (peritoneum) is seen; this is best broken down with the fingers. The hand is pushed into the belly backwards towards the rim of the pelvis bone, and the horns of the womb are found and followed up till the ovaries are felt; they vary in size from that of a bean to that of a small walnut. The ovaries are then drawn out, either singly or together, and squeezed off with an emasculator, or twisted off. A few stitches are put into the skin wound and a tar and tallow plaster put over them. The cow should be kept without food for a few hours before and after the operation. If performed through the bearing, the operation requires special instruments, one being to stretch the passage, to allow of a cut about 3in. or 4in. long in its upper wall, about 2in. from the neck of the womb. The ovaries in their ligament are sought and drawn into the passage, the ligament is cut with special long scissors, and the ovaries cut off with an ecraseur or special torsion forceps.

BOT FLIES AND BOTS.

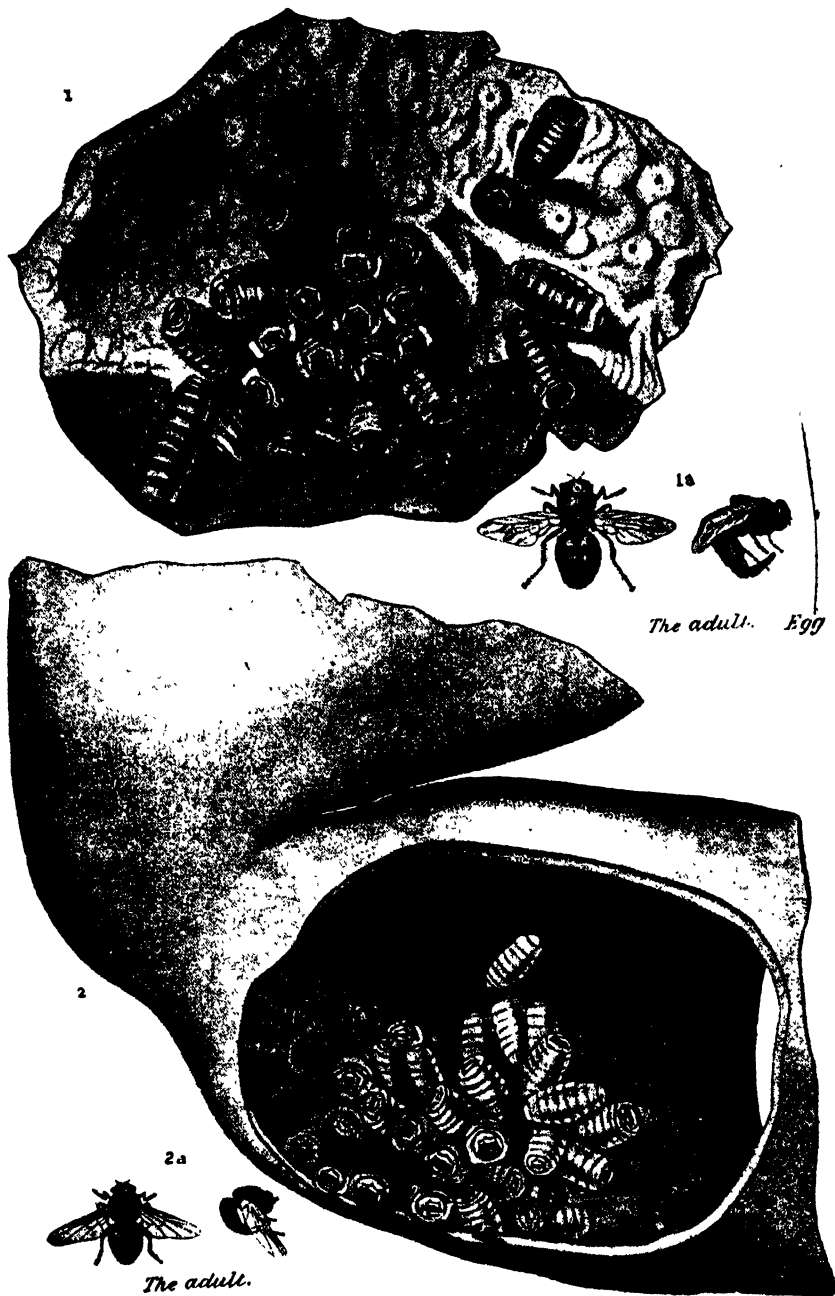
In view of the many requests received for information concerning Bot Flies and Bots, the following notes, contributed by the Government Veterinary Lecturer (Mr. F. E. Place, M.R.C.V.S., B.V.Sc.), should prove of interest:—

There are many kinds of bot flies known to science, but in South Australia only two or three give trouble, and they are not the direct cause of horses' deaths. The accompanying plates show the two most common forms, a shade less than life size.

The flies are somewhat like small bees, with fawn yellow bands and bellies, the male is blunt behind, the female sharp-pointed. They do not sting, and only approach the horse to lay eggs; usually they hover round the horse, and dive under the belly in order to lay eggs upon the long hairs of the chin, shoulder, and back of the fore legs; the fly shoots the tiny conical egg down the sharp slides often mistaken for a sting, and glues them on the hair, repeating the process until many scores are laid. Within a day or two tiny white maggots or wrigglers force up the trap door at the blunt end of the egg, and wriggle along the hair, adhering by means of the gluey substance from the egg; the irritation they cause makes the horse rub and lick and so they get into the mouth, where probably only one in fifty survives to reach the stomach, upon the mucous lining of which, generally near the exit, they attach themselves by means of anchorlike hooks. All this happens in the summer months, and they remain hanging on for eight or ten months, eventually letting go and passing out with the dung in the early morning. They then wriggle out of sight, under stones and so forth, and for a few weeks live in their hard, shining, brown cocoons, eventually issuing forth as perfect insects, to begin the cycle of life again in the early summer.

Owing to the wonderful arrangement of their breathing organs in their hinder segment, and three divisions of the upper part of their digestive system, they pass their lives in the stomach impervious to practically everything which would dislodge them. The irritation they cause, sometimes resulting in ulcers, undoubtedly affects the horse's digestion, and in very rare instances they seem to have blocked the outlet of the stomach and have caused a mechanical stoppage. They do not eat through the stomach or the bowel just beyond it; the redness and roughness of the part of the stomach where they are most often found being quite natural. After they have quit sometimes there are tiny ulcers showing where they were attached.

There are no definite symptoms during life, only those common to any irritation in the stomach, namely, bad doing, harsh coat, sometimes biting just



BOTS.

1. Bots in the Stomach.
2. Bots in the Small Gut/ close to the Stomach.

behind the breast bone, and drawing the chin down to the chest as if slightly choking, and very rarely colic, this latter being generally the result of some indiscretion in feeding rather than due to the bots. Practically every horse in the country has some bots in its stomach, and most horses in towns for the first year they are there.

The bots having proved so resistant to the action of drugs, such treatment cannot be recommended, but as ox or sheep gail shrivels them up and makes them let go, horses suspected of harboring bots may be starved for 24 hours to get the stomach as empty as possible, and then drenched in the early morning with three or four ounces (half a cupful) of fresh gall in a pint or more of warm milk, and two hours later with a pint of raw linseed oil in which two or three tablespoonfuls of turpentine have been well shaken up, or, if preferred, a five-dram aloes ball may be given, and the bots will be found in the dung early next day.

As preventives, the long hairs under the chin and behind the knees should be clipped, those parts dressed with some sticky strong-smelling substance, such as castor oil and tar, kerosine, carbolic, &c., and a scarf with waving ends allowed to flap under the throat to prevent the fly settling.



MURRAY BRIDGE.

MORTALITY AMONG BEES.

"ISLE OF WIGHT" DISEASE.

Recently the beekeepers of South Australia have suffered severely by losing the majority of their hives through a dwindling of the bees. Specimens of live bees from hives known to be rapidly dwindling were examined by officers of the Government Laboratory of Bacteriology and Pathology, and the following report on the investigation has been forwarded by the Director of the Laboratory (Dr. de Crespigny) to the Director of Agriculture. The research work was undertaken by Mr. Lionel B. Bull, B.V.Sc.

INTRODUCTION.

Investigation has been carried out in order to demonstrate the presence or absence of a protozoan parasite in the gut of the bee, which parasite has been demonstrated in England and the Continent to cause a disease similar in nearly every respect to the one now causing such heavy mortality among the bees of this State.

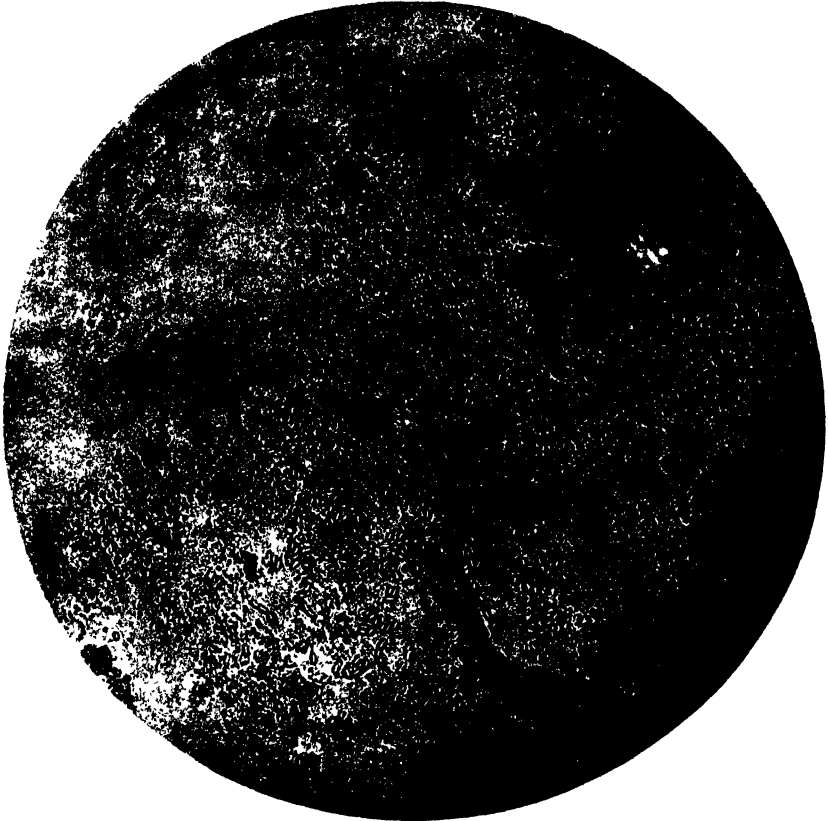
The work of Fantham and Porter has shown absolutely conclusively that this protozoan parasite is the cause of the disease commonly known as the "Isle of Wight" disease, but called by them microsporidiosis. This parasite attacks the chyle-stomach of the bee. Bees affected with this parasite present certain habits, and most of these have been observed in bees from infected hives in this State.

The question of symptoms is rendered difficult by the fact that bees vary very much among themselves. Bees affected usually show some degree of paralysis, and are found feebly crawling about the ground and the grass around the hives. The abdomens of diseased bees are usually distended and there is diarrhoea. These are the most common symptoms observed, but they may vary in individual hives and in different outbreaks.

The protozoan parasite known as *Nosema apis* is to be found mainly in the chyle-stomach of diseased bees. Here the young form, planont, penetrates the epithelial cells lining the stomach. It grows at the expense of the cell protoplasm. It multiplies by several variations of simple transverse or longitudinal divisions. These dividing forms are called meronts, and they remain within the epithelial cell, but continuing to divide they may crowd the cells with several generations of meronts. The functions of the epithelial cell is thus destroyed. This leads to malnutrition and further lowering of resistance, and the parasite is enabled to attack with little or no resistance

being offered on the part of the cell. The parasite eventually reaches the spore stage within the epithelial cell.

If the chyle-stomach is examined at this stage it will be seen that it is paler in color, sometimes even being chalky-white, and is more fragile and brittle. The intestine is usually also paler and is distended. The alteration in appearance is due to the presence of large numbers of spores in the wall of the gut. The spore is very resistant, and it is through this property that



NOSEMA APIS: SPORE FORM (X 350).
(Preparation from Chyle-stomach of a Bee).

infection of other bees and other hives is capable of being spread. The spore is typical in appearance, being a somewhat elongate, usually oval body measuring from 4 to 6 microns long by 2 to 4 microns broad. They are highly refractile bodies and can easily be recognised, either by a low or high power of the microscope (see Fig. 1).

The means of spread of this disease is by the heavily infected faeces passed by the diseased bees. The resistant spore passed in the faeces is incapable of further development unless it be taken into the gut of the bee. It

passive agent. The parasite gains access to the host either with food or drink of the bee, or by bees licking one another in the general cleansing operations of the hive. Diseased bees void their excrement anywhere, on alighting boards, frames, combs, &c. In this way infection is spread and may continue over a long period of time.

Robber bees help to spread infection from hive to hive. Infected drones, by visiting several hives in succession, also aid this spread. The spores may also be distributed by the wind infecting drinking-places, &c. The use of old comb which may be affected is also capable of conveying infection.

IDENTIFICATION OF THE PARASITE.

In this laboratory bees from eight different apiaries have been examined. They were all received alive. They were chloroformed and then dissected immediately. The chyle-stomach was dissected out and removed wholly, placed on a slide and teased. A drop of normal saline solution was then added and a cover glass applied. The preparation was then examined under the low power of the microscope. The spores are quickly seen when present and distinguished as highly refractile oval bodies. Young forms are more difficult to demonstrate in the fresh state. In every case the cover glass was removed and the material smeared over the slide, which was allowed to dry in the atmosphere and then fixed by placing in absolute alcohol. Smears, after remaining in the alcohol from two to twelve hours, were removed, allowed to dry, and then stained by placing in a weak solution of Giemsa's stain for from 12 to 18 hours. Young forms could be more easily demonstrated in the stained preparations. This procedure is necessary, for often young forms are almost the only indication of infection, and these may be present in very great numbers.

At first only the contents of the chyle-stomach were examined, but it was found that more definite results were always obtained after teasing the whole stomach and breaking down its wall. In this way the spores were liberated from the epithelial cell, and one could form a better idea as to the extent of the infection.

Usually only 10 bees from each lot were examined, and a rough idea as to the percentage of bees affected was obtained.

The first lot to be examined were healthy bees from a clean hive. No evidence of the presence of *Nosema apis*, either in the spore stage or the young stage, could be seen after removal of the chyle-stomach and examination as just indicated.

The following specimens were all taken from hives showing dwindling:— Lot No. 2 was from a hive which was showing dwindling. Roughly 50 per cent. of the bees examined were affected with *Nosema apis*, the young forms being very numerous. Lot No. 3 showed the presence of the parasite in about 20 per cent. of the bees examined. Lot No. 4 showed the presence of spores of *Nosema apis* in 100 per cent. of bees examined. Usually the

spores were very numerous, constituting practically the whole of the material under the cover glass, but in some cases only a few spores were seen. Lot No. 5 showed the presence of spores exceedingly numerous in 100 per cent. of bees examined. The chyle-stomach was much distended, opaque, whitish in appearance, and the contents were milky. Lot No. 6—Spores were present in all the bees examined. Lot No. 8, consisting of bees sent from a district where the hives up to the present time had remained apparently clean. The bees were described as suffering from "bee paralysis," and, upon examination of the chyle-stomach, spores of *Nosema apis* were demonstrated in 100 per cent. of the cases.

It will be seen that the percentages are very high, but in some cases the infection was apparently only very slight. The low percentage of cases affected in the first two lots may be explained by the fact that only the contents of the chyle-stomach were examined, the wall not being teased.

The work conducted in this laboratory has only been done in order to demonstrate the presence or absence of *Nosema apis* in bees that came from hives known to be dwindling. The destruction of hives has been enormous, some beekeepers losing the whole of their stock.

As far as one is able to ascertain, *Nosema apis* is not regarded as being the main cause of dwindling in hives in Victoria. Whether this opinion is the result of imperfect examination or not one is not in the position to say. The experiments carried out by Fantham and Porter have demonstrated conclusively that the *Nosema apis* is the exciting agent in so-called "Isle of Wight" disease, and its pathogenicity for bees is absolutely proven. In the light of this work it has been considered sufficient to demonstrate the presence of *Nosema apis*, either in the young multiplying stage or in the spore stage in diseased bees in order to prove that the bees in this State were suffering from identically the same disease as Fantham and Porter describe as Microsporidiosis. The small amount of work done here has gone to support the observation and experiments of Fantham and Porter.

REMEDIAL MEASURES.

Naturally the beekeeper asks for a successful treatment, but preventive measures alone are to be recommended. Maintaining the vitality of the colonies is an important factor. In preventing the spread of the disease through the apiary the most stringent methods will be found to be the most successful. The only successful destructive agent of the *Nosema* spore is fire. All dead bees should be burned. The infected hives should either be destroyed or thoroughly gone over with a painter's lamp. The soil around infected hives should be removed to the depth of several inches, straw scattered about and burned, and then lime applied fairly heavily. It is advisable to destroy all diseased stocks. Diseased bees should not be removed to uninfected areas, but apparently healthy bees might with advantage be removed to another area.

TESTING MILK AND CREAM.

THE USE OF THE BABCOCK TEST.

By H. J. APPS, Dairy Officer.

Two of the greatest benefits bestowed on the dairying industry during the last quarter of a century have been the introduction of centrifugal separation of milk and the testing of milk and its products for butter-fat.

The results following the adoption of testing have been— (1) Milk is paid for according to quality ; (2) prevention of loss of butter-fat in the manufacture of cheese and butter ; (3) improvement in the uniformity of manufactured products ; (4) the selection of the best cows from the herd.

The first three phases have been almost universally employed with marked success, consequently greater advancement has been shown in this branch of agriculture. The fourth phase, viz., the selection of the best cows by testing for butter-fat, will eventually prove as great an agent for the further advancement of dairying generally. In order, therefore, that any intelligent person can perform this operation, it is intended to outline the necessary procedure to employ to successfully carry out each step.

SAMPLING.

Perhaps the most important item is the taking of a sample of milk for testing purposes. Before any attempt is made to take a sample the milk should be uniformly mixed. In the case of milk freshly drawn from the cow it should be poured from one bucket to another for at least three times—



SAMPLER.

stirring has not the same effect ; then insert the sampler, which, for ordinary purposes, should be a miniature dipper attached to a handle and capable of holding from 2ozs. to 3ozs. In cases where milk has been kept for a time and its temperature has decreased it becomes necessary to heat it to 98° F., for the average temperature of the milk upon leaving the cow is 98° F. It is far better when sampling to take an aliquot part ; say one took 2ozs. from a cow producing 3galls. daily, then for a cow yielding 4½galls. one would

need to take 3ozs. Should it not be convenient to test daily, then one may allot one day in each week in which to carry out the tests, but it will become necessary to preserve the samples.

Composite sample bottles with a capacity of about 12ozs. are most convenient. Each bottle should have a brass collar attached to it, with the name or number of the cow. The corks for such bottles should be of india-rubber, thereby preventing the danger of any fat adhering, as in the case where ordinary corks are used. In order to preserve the milk place two drops of formalin in each bottle in winter and four drops in summer. Upon the addition of a fresh sample of milk give the bottle a gentle rotary motion



COMPOSITE BOTTLE

to thoroughly mix the contents. Be careful not to exceed the amount of formalin quoted, for an excess of formalin has the effect of retarding the dissolution of the curd when the acid has been added.

AMOUNT OF MILK FOR TESTING PURPOSES.

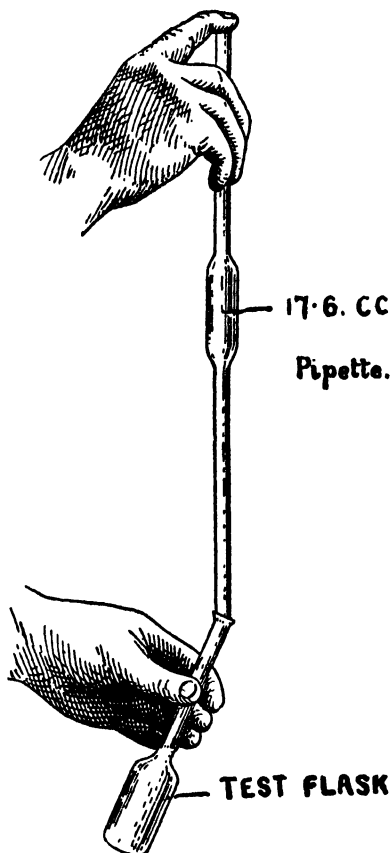
See that the temperature of the milk is about 98° F.—it must not be less than 90°. If it is below this temperature allow the bottles to remain in water at a temperature of 120° until the correct temperature is secured. Then shake the bottle well and pour the milk into a pannikin, and then from one pannikin to another for at least three times.

The exact quantity required for the test is 18 grammes, but for convenience a pipette, capable of holding 17-6c.c. is employed. The total quantity of milk delivered into the test flask will be 17-5c.c.; .1 is allowed for what may adhere to the glass. In drawing the milk up into the pipette care should be taken not to admit any air bubbles, and allowance made for any froth that may be present on the surface of the milk. Hold the pipette up level with the eyes and you can quite easily delineate the true surface.

TRANSFERRING THE MILK.

In transferring the 17-6c.c. of milk from the pipette to the test flask do so holding the flask at an angle to the pipette, otherwise the air in the flask may be forced out, thereby causing the milk to spurt out of the neck of the flask. With some pipettes you can pass through the neck into the bowl portion of

the flask. Then give a gentle blow to remove all traces of milk from the pipette. Having secured the necessary number of flasks of milk, reduce the temperature of the milk within the flasks to 70° F. by allowing the flasks to remain in cold water.

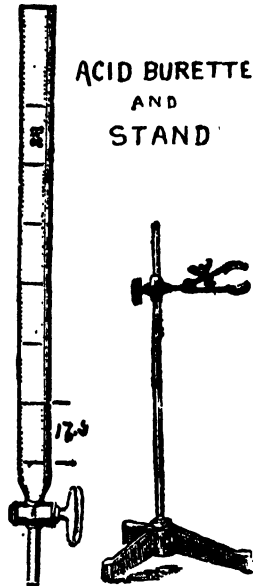


ADDING SULPHURIC ACID.

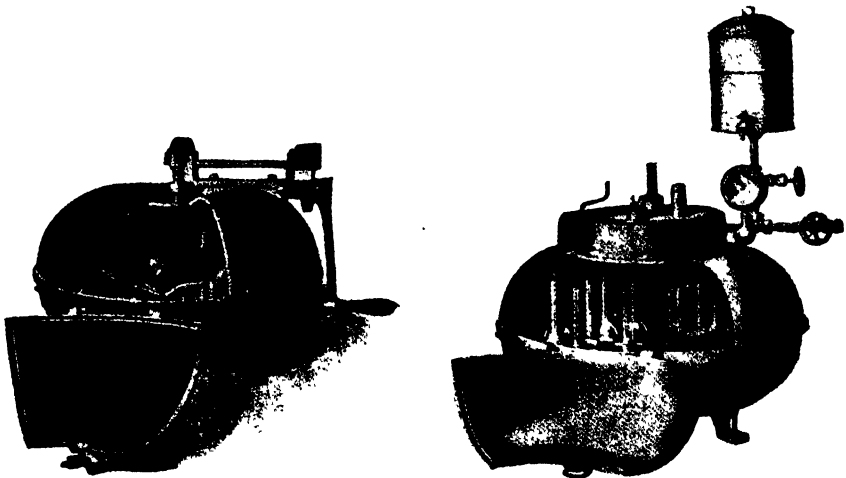
The next step is the addition of sulphuric acid, which should be of a specific gravity of 1.827 to 1.830. The temperature of the acid should be the same as that of the milk, viz., 70° F.

For the purpose of measuring the acid either a cylindrical glass capable of holding 17.5c.c., or a burette graduated into 17.5c.c., may be used. In transferring the acid from the tube into the flask, do so holding the flask at an angle to the tube or burette, at the same time revolving the flask. Should the acid be allowed to fall directly on to the milk, probably it will cause the fat to become charred. By revolving the flask the acid will remove any milk that may adhere to the inside of the neck of the flask. After the addition

of the acid place the flasks either in a cradle or else shake separately by hand, giving a gentle rotary motion until all traces of curd have disappeared, at the same time preventing any of the contents of the flask from going into the neck portion.



The temperature of the contents of the flask will be about 140° F. This heat is generated owing to the action of the acid upon the water of the milk. The color will gradually change from brown to dark-brown, due to the action of the acid upon milk sugar and casein.

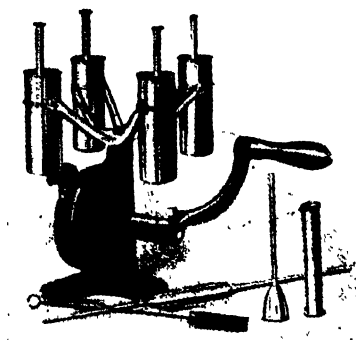


HAND AND STEAM TESTERS.

The test flasks may now be placed in the machine, which should be kept at a speed of from 1,000 to 1,200 revolutions per minute for five minutes and then allowed to run down. Always see that the machine is balanced.

ADDITION OF HOT WATER.

After this add distilled or rain water to the flasks at a temperature of 180° F., just sufficient being added to bring the contents of the flask up to the shoulder portion. A can which has attached to it an indiarubber tube and pinch cock placed conveniently above the machine will be found to be a great advantage. With steam-driven testers the hot water can is annexed to the machine. Again set the tester in motion and run for one minute; allow the machine to stop, and again add hot water sufficient to bring the contents of the flask up to the eighth or ninth graduation on the neck of



HAND TESTER.

the flask. Then again whirl the tester for four minutes, and when the machine has become stationary the test may be read off.

READING THE TESTS.

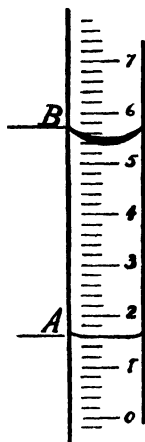
For the purpose of recording the percentage of the column of fat a pair of dividers are necessary. Read from where the fat touches the side of the neck, that is from the top and bottom of the meniscus. By reading in this manner, especially should the surface be concave, allowance will be made for any fat that may have possibly been prevented from gaining admission to the neck of the flask.

HOW TO CALCULATE THE PERCENTAGE.

The test flask generally holds 40c.c. The neck of the flask is graduated from 0 to 10. The full graduations represent 10lbs., and each pound is divided into five equal parts representing two-tenths or one-fifth of one pound. Assuming that the amount of milk used in the test is 17.5c.c., it will weigh 18 grammes. The graduated portion of the flask from 0 to 10, is made to hold exactly 2c.c.; 1c.c. of milk-fat has a specific gravity or will weigh

·9 grammes, therefore, 2c.c. of fat, the quantity required to occupy the space between 0 to 10, weighs 1·8 ($\cdot 9 \times 2$) grammes, which amount is exactly 10 per cent. of the 18 grammes used in the test. In order to make the graduation on the neck clear a little burnt cork or lampblack may be applied. Each flask should have a frosted portion for the inscription of the number of the sample.

The color of the fat column should be golden yellow, and the line between its lower limit and the acid solution should be distinct. However, fat from cows far in their period of lactation and absence of grasses will give rather a lighter shade.



READING FAT COLUMN.

Should the fat column show the presence of particles of curd, or have a cloudy appearance, it will probably be due to insufficient or too weak sulphuric acid, incomplete mixing of the milk and acid, not sufficient speed, or to the temperature of the milk and acid being too low.

Black specks or a darkened appearance of the column are due to one or more of the following :—Acid too strong, too much acid, allowing acid and milk to stand too long before mixing, or allowing the acid to fall directly on to the milk when being poured into the flask. Bubbles of gas present as foam on the top of the column are generally due to the water containing carbonates. This may be prevented by adding a few drops of acid to the water. When the foam interferes with the reading, a few drops of alcohol dropped on to the column will cause it to disappear. The alcohol makes a defined line, but if allowed to remain for any time it will mix with the fat and increases the height of the meniscus.

Should the tests not be read off at once they may be allowed to remain in water at a temperature of 140° F. for 15 minutes ; but it is imperative for best results that the tests be read immediately the machine has stopped.

(To be continued.)

FARM ANIMALS.

HEREDITARY UNSOUNDNESS—(*continued*).

By C. A. LOXTON, G.V.M.C., Assistant Government Veterinary Surgeon.

ROARING.

Noisy and disturbed breathing may be due to any cause which obstructs the passage of air to the lungs. The particular disease to be considered in connection with hereditary unsoundness is due to paralysis of certain muscles of the larynx caused by some disturbance with their nerve supply.

Paralytic roaring usually comes on gradually; its course is chronic, and it tends to grow worse with age. The left side of the larynx is that most commonly affected. The characteristic roaring sound is emitted usually only during inspiration, but in bad cases also during expiration. The best method of testing for this disease is to put the animal to severe exertion. In slight cases the sound is not evident unless this is done, but very slight exertion is sometimes sufficient to cause the animal to make abnormal respiratory sounds. A peculiar cough is sometimes present. Roaring is most frequent in thoroughbreds and is rare in ponies. The late Professor Axe says—"Liability to roaring increases with the height of the animal and length of neck." Among the predisposing causes of roaring the most important is climate; hereditary predisposition being well marked in damp cold climates, while the disease is uncommon in warm, dry climates.

CATARACT.

This disease consists in an opacity of one of the deeper structures of the eye known as the crystalline lens, which is situated immediately behind the pupil. The effect of this opacity is to obstruct the passage of light to the retina, and so cause partial or complete blindness, depending upon the extent of the disease. Opacities of the cornea—the transparent membrane which forms the anterior coat of the eyeball—must not be mistaken for cataract.

When cataract is well developed the pupil has a whitish or greyish appearance, but small cataracts require closer observation for their detection. The eye may be examined by shading the eye with a black hat, the head being turned away from the light; or a closer examination may be made in a dark loose box by moving a lighted candle before the eye. In the normal eye three images of the light will be seen, the first two erect, which move in the same direction, and the third, a small inverted image, which moves

in the opposite direction to the candle. In cataract the third and sometimes the second image is indistinct or obscured.

OSTEOPOROSIS.

A constitutional disease of the bones, in which the inorganic constituents are absorbed and the bones become swollen, soft, and porous. The whole skeleton is more or less involved, but the condition is most noticeable in the bones of the face, especially in those of the nose, upper and lower jaws, the disease being known as "nasal disease" and "big head."

Osteoporosis develops gradually, and the early symptoms are very indefinite. There is first slight stiffness of gait and loss of condition. A shifting lameness is developed, the animal being lame in one limb at one time and then in another. This is followed by swelling of the bones of the nose and jaws and disappearance of the sharp lines and angles of the face. The bones increase in size and become soft and spongy, so much so sometimes as to yield to the pressure of the fingers. Mastication becomes difficult owing to the teeth becoming loose, and in the later stages of the disease the bones are so altered in structure that the ligaments become torn from their bony attachments, and the animal is unable to get up.

Osteoporosis is more common in young horses and usually has a fatal termination, though the duration of the disease varies from a few months to two or three years. The disease is rare in Australia, but is of frequent occurrence in South Africa and the Sandwich Islands; in fact, in the latter country the disease takes an endemic form and the mortality is very high.

Post mortem.—The bones are much enlarged, soft, and porous, and may be cut with a knife. They are also abnormally vascular. The internal organs are generally normal.

SHIVERING.

A nervous disease characterised by a peculiar trembling and shivering of the muscles of the hind and occasionally the fore legs. The characteristic involuntary movement of the muscles consists in an irregular contraction and relaxation, which gives the name "shivering" to the disease. The disease is chronic, incurable, and becomes worse with age.

The symptoms are sometimes intermittent, but are best shown during "backing" and "turning round." In backing the hind feet are not lifted, the back is arched, and there is trembling of the muscles of the hindquarters. In some cases the tail is spasmodically elevated. The peculiar quivering of the muscles is sometimes shown when the animal is stopped suddenly, and also by making him "stand over." Raising the feet in shoeing causes much distress. When turned sharply the hind legs move in a jerky, uncontrolled manner, but quite distinct from the movement distinguishing stringhalt. The disease is not a common one, but is most often seen in draught horses.

UN SOUND FEET.

In relation to hereditary unsoundness the term "unsound feet" refers principally to defects of conformation. The importance of good sound feet in all classes of horses cannot be too strongly impressed upon the minds of breeders, and horses with a tendency to faulty conformation of the foot should be rigidly excluded from breeding.

The axiom of breeding that "like begets like" is of quite as much importance here as in other points of conformation, and the old maxim "no foot no horse," should not be forgotten in the choice of horses for breeding purposes. Defective feet not only lessen the market value, but predispose to disease, and this predisposition is aggravated by faulty shoeing.

The principal defects to be avoided are—Flat feet, upright (boxy) feet, weak heels, contracted feet, brittle hoofs.

BITTER PIT IN APPLES.

MR. D. McALPINE'S INVESTIGATIONS.

FIRST PROGRESS REPORT.

Mr. D. McAlpine, Victorian Government Pathologist, who, on behalf of the Commonwealth and States Governments, has since August, 1911, been investigating the causes and remedy for bitter pit, has issued his first progress report. The report is voluminous and interesting, and bears on the face of it the painstaking manner in which Mr. McAlpine has carried out the duties with which he was intrusted. It should be remembered that the experiments connected with Mr. McAlpine's investigations are by no means concluded, and it is highly probable some of the opinions expressed in this report will be considerably modified as the result of subsequent research. Mr. McAlpine writes—"To any orchardist who is familiar with this disease, and has suffered loss through it, its general characters are too well known to require description, but since there are various appearances, mistaken for it, and other diseases associated with it, a clear description of its nature and characteristics will show exactly what we are dealing with in this investigation. It is often stated that bitter pit is not a disease at all, and if it were due to local poisoning, as is sometimes asserted, then, in the strict sense of the term, the point might be conceded; but this is one of the appearances mistaken for it. Even orchardists who recognise the true nature of the

trouble sometimes deny that it is a disease. As one puts it, it is neither contagious nor infectious, and therefore not a disease; but this is merely applying a meaning to the term 'disease,' which is not generally accepted. The naked-eye characteristics of the disease, which is peculiar to pip fruits—such as apples, pears, and quinces—are that there are pits and depressions on the skin, and these hollows on the outside represent a corresponding shrivelling or shrinking of the tissue inside. These depressions are numerous, and mostly on the upper (or calyx end) half of the apple. They vary in size from mere dots up to points one-eighth of an inch in diameter, but they may run into one another and form larger depressions. They are generally roundish in outline, and the color varies from a pale to a dark green, but on the same apple they may assume a ruddy brown or a dark brown tint. The outside appearance, however, is variable, according to the stage of the disease. There may be no external indication whatever, and it is only when you begin to eat the apple and find it bitter to the taste and with brown spots through it, that you realise the presence of bitter pit. As a rule, however, there are surface indications. When a transverse section of the apple is made, internal brown spots may occur all round, generally beneath the skin, with occasional spots scattered through the flesh, and reaching even to the boundary of the core. These spots are at first of a pale brown tint, and gradually turn a darker brown. The brown tissue is generally dry and of a loose and spongy texture, as if honeycombed. The rotting of the fruit affected with bitter pit is also characteristic. The apple, as a whole, becomes brown, the pulp turning soft, and, although shrivelled and sunken, there is no breaking of the skin. Trees subject to the disease may be perfectly healthy otherwise."

MISTAKEN FOR BITTER PIT.

There are a number of fruit spots which may be variously caused, and which have a superficial resemblance of bitter pit, but Mr. McAlpine points out that, from the symptoms outlined, a careful observer should be able to discriminate between that disease and the various appearances likely to be mistaken for it. The following appearances were brought under his notice as cases of bitter pit:—Hail marks, bruised skin, effects produced by chemical reagents, and local poisoning, as by arsenic for checking the codlin moth. The following diseases are found associated with bitter pit:—Black spot or scab, bitter rot, glassiness or watercore of the apple, mouldy core of the apple.

HOW VARIETIES ARE AFFECTED.

A list of the apples compiled by responsible authorities in each State shows how the different kinds are affected. In South Australia the following have been the results:—

Badly affected—Baldwin, Cleopatra, Esopus Spitzenberg, Garibaldi, Hoover, Northern Spy, Ribston Pippin, Scarlet Nonpareil, and Shockley.

Moderately affected.—Cornish Aromatic, Cox's Orange Pippin, Dumelow's Seedling, Jonathan, Lady Henniker, Maiden's Blush, Prince Bismarck, Shepherd's Perfection, Sturmer Pippin, Winter Majetin.

Seldom affected.—Adam's Pearmain, Buncombe, Dougherty, Dunn's Seedling, Morgan's Seedling, Newtown Pippin, Nickajack, Rienette de Canada, Rymer, Strawberry Pippin.

Never affected.—Five Crown or London Pippin, Rokewood, Rome Beauty, Stone Pippin.

From the exhaustive inquiries made by Mr. McAlpine he has found that growers are generally agreed that a light crop suffers most when the fruit is large, and that the general impression is that the nature of the soil has not much to do with the prevalence of bitter pit. In Victoria a number of growers consider that manuring has no effect upon the disease, but a large number regard it as conducive to it, since it stimulates growth. In South Australia very few growers were able to state from experience the effect of manuring. The effect of drainage is regarded by some as of no consequence, and by others as the principal cause. There is a very general impression that cultivation increases the pit, but in South Australia opinion on the question is about equally divided. The system of pruning adopted is generally believed to influence the disease, and severe or hard pruning is considered to favor it. That a wet winter favors the disease is the opinion held by the great majority of orchardists in Victoria. In New South Wales opinions are divided, and in South Australia the orchardists consulted believed that wet seasons favored the disease. "After carefully considering the replies received," writes Mr. McAlpine, "there are certain facts borne out by the collective experience of growers. Of course, the greater the number and the more representative the orchardists, the more value will be attached to their conclusions; but in some of the States only a small proportion availed themselves of the opportunity. Thus, in South Australia, out of 83 fruitgrowers to whom the circular of questions was addressed, only 21 forwarded replies. Another common source of error, which renders the replies in many instances of little or no value, is that some general treatment is applied to the trees, in the way of manuring, or liming, or pruning, but no check trees are left untreated to show what the result would have been without such special treatment. The following facts may be considered as established from the reports received:—(1) That the disease is much more generally distributed among apples than pears; (2) that some varieties of apples are much more susceptible to the disease than others, Cleopatra being one of the worst, and Yates being the least affected, if at all; (3) that the disease has been definitely known in Australia at least since 1886; (4) that the disease is worse on trees bearing a light crop and large fruit; (5) that severe or hard pruning favors the disease; (6) that the disease may occur in apples, pears, and quinces;

(7) that the disease may appear in a wet or dry season, although the prevailing opinion is that wet seasons are the worst."

REMEDIAL MEASURES.

"It would be premature," states Mr. McAlpine, "to suggest any remedial measures until the results of the experiments now being conducted are known, but the practical conclusions drawn from the experience of German orchardists may be given. These were obtained from 107 replies to questions, and they were published in 1909. The recommendations," says the Victorian expert, "are justified from what we know of the disease in Australia. They are as follows:—(1) Light pruning, taking care to admit light at the top; (2) thinning not to be overdone; (3) growth not to be stimulated by fits and starts in the growing period, and water or liquid manures not to be applied too late in the autumn; (4) not to pluck the fruit too late; (5) not to have the storeroom too dry; (6) to re-work, that is, to graft another variety on the old stock."

CONTROLLING THE DISEASE.

With the object of devising a remedy for the disease, there have necessarily been researches in the laboratory as outlined in the summary below, as well as experiments and systematic observations in the orchard. The lines along which experiments are being conducted in the different States are not only promising, says Mr. McAlpine, but they cannot fail, from the varied conditions under which they are being carried out, to be of great indirect benefit to the apple-growing industry as a whole.

ORCHARD EXPERIMENTS.

Experiment stations have been established in Victoria at Burnley Horticultural Gardens, Box Hill, and Deepdene; in South Australia, at the Government Experiment Orchard, Blackwood; in New South Wales, at the Bathurst Experiment Farm; in Tasmania, on the Tamar River Valley Orchard; in Western Australia, at Mount Barker Estate; and in Queensland, at Stanthorpe.

COLD STORAGE.

The results of these experiments clearly show that a sufficiently low temperature, kept uniform, retards the development of bitter pit; and in order that apples should arrive at their destination as free from disease as they were when shipped it is necessary, in Mr. McAlpine's opinion, to avoid fluctuating temperatures. What is needed is a linking up of cold storage from the vicinity of the orchard to the ship's hold. If the fruit is kept uniformly cool the development of bitter pit in transit will be a thing of the past.

SUMMARY OF INVESTIGATION.

Mr. McAlpine's report, which is well furnished with illustrations, concludes with the following summary :—

“ It is a fundamental principle of pathology that the normal structure and functions of the part or organ concerned should be determined as far as possible in order that the abnormal conditions may be properly understood. The structure and functions of the apple and pear were therefore investigated, with the result that on the removal of the skin and flesh after softening there remained a delicate skeleton and vessels as a model of the whole, ramifying and permeating every portion of the fruit, supplying the seed vessels and the flesh with liquid nourishment and forming a network of vessels immediately beneath the skin. The vascular network was found to originate in the earliest stages of the fruit, and continues to expand with the enlarging flesh. It is shown that neither insects nor fungi, bacteria, nor external agencies, such as spraying, are concerned in the production of bitter pit.

“ Bitter pit is seen to be an internal disease, due to internal causes, and always found associated with the discolored vascular bundles. ‘ Crinkle,’ or ‘ pig face,’ or ‘ hollow apple,’ is shown to be a confluent form of bitter pit, every gradation being observed from pit to slight and advanced crinkle. Large cavities are formed by the rupture of the tissue, owing to rapid and successive growth at the periphery. Diseases found associated with bitter pit were black spot, bitter rot, glassiness, or water core, and mouldy core. Appearances mistaken for bitter pit were hail-marks, bruised skin, effects produced by chemical reagents, and local poisoning. Pitted apples are produced on unsprayed trees, and a chemical analysis of such apples revealed no trace of mineral poisons.

“ It was found, so far as my investigations go, that the key to the solution of the bitter pit problem lay in the wonderful vascular system which permeates the core and the flesh, and the marvellous network of vessels just beneath the skin, their function being to regulate and equalise the distribution of food material at the periphery of the fruit, where the greatest and most rapid growth normally takes place. The brown spots of bitter pit are generally first formed in the zone occupied by the vascular net, of which there is ocular demonstration in the position of the tough brown spots still adhering to the apple in which the network is found. There is a striking demonstration of this in the fact that the same place of origin of the brown spot has been noted by competent observers in Europe, America, and Africa, even though the existence of the network is unknown to them. The earliest external appearance of bitter pit was noticed when the fruit was about the size of a walnut, but it generally occurs when the fruit is half-grown or approaching maturity. It generally occurs in the upper half of the fruit and towards the ‘ eye ’ end, and this is correlated with the openings in the skin being much more numerous in the upper than in the under portions. Chemical

analysis shows that there is less water in the flesh of the upper portion. The larger number of openings will necessarily allow more active transpiration to go on at the 'eye' end than at the stalk end, and, owing to this extra transpiration there is less water in the flesh at the top.

"Bitter pit may be associated with wet or dry seasons; so long as they are intermittent and fluctuating in their character at the critical period of growth. The principal contributing factors to bitter pit are:—(1) Intermittent weather conditions; (2) amount and rapidity of transpiration; (3) sudden checking of the transpiration at night, when the roots are still active owing to the heat of the soil; (4) failure of supplies at the periphery of the fruit, followed by spasmodic and irregular recovery; (5) inequality of growth, so that the vascular network controlling the distribution of nutritive material is not regularly formed; (6) fluctuations of temperature when fruit is in store; and (7) nature of variety. The weather cannot be controlled (except so far as a smoke-blanket is allowed to drift over the orchard on frosty nights), but the soil and the tree, and the fruit formed, may be controlled to a large extent by cultivation, manuring (including green manuring), irrigation, the stocks used, and the method of pruning. The relation of each of these factors is being determined by means of experiments. Young and vigorous trees making rapid growth may have pitted fruit, from the rapid transpiration and excessive growth interfering with the regular development of the vascular network. A light crop, with abnormally large fruit, is more liable to pit than a heavy crop of average-sized fruit equally distributed over the tree.

"Certain varieties of apples develop bitter pit in store when subjected to a fluctuating temperature and humid conditions. When apples, even very susceptible varieties, are kept at a temperature of 30-32° Fahr. the development of bitter pit is retarded. There is a scientific explanation for this in the fact that there is a lower limit of temperature beyond which respiration is suspended, and this is generally one or two degrees below the freezing point of water. So the apple in this temperature is in a state of suspended animation. The delicate structure of the apple and its abundant supply of vessels show the necessity for careful handling and skilful packing for export."

POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR JANUARY.

Please Note.—The list of entries for the laying competitions at the Government poultry stations, Roseworthy and Kybybolite, will close at the Poultry Expert's Office, Adelaide, on January 31st, 1913. A special class is open to farmers, pastoralists, fruit and vegetable growers. Will the above make an effort to support this section, which is in their interest. Recognised breeders are not eligible to compete in this section, whether they are farmers, &c., or not. It is designed to encourage those who have hitherto not competed. The regular breeders have the two open sections. The entry fees are 10s. per pen of six pure-bred pullets, and the prizes are £10, £5, £3, £2, and £1 in each section. Bureau members should arrange for one of their number to nominate a pen, as follows:—Pen Leghorns, J. Smith, Oodnadatta Branch. If a good percentage of such entries came in connection with the Bureau it would serve a double purpose.

Water Supply.—During the summer months strict attention must be paid to the drinking water and the containing vessels. Most diseases are spread through the medium of the drinking water. The fowls' body, as well as the eggs laid by a hen, contain a large percentage of water. Laying hens at all times drink water freely. The great heat of summer increases the demand for water. Keep all water vessels scrupulously clean and shaded.

Green feed should be grown and used freely. It is better to manure and well cultivate a small plot of ground which can be irrigated rather than attempt operations on a large area for which no water is available.

HOUSING POULTRY.

The average accommodation provided for poultry owned by many breeders is an absolute disgrace. In the work of this department many private poultry yards are inspected, and in far too many cases there is a total disregard of sanitation and also of the comfort of the birds. It is absolutely cruel to keep poultry in small, hot back yards, where there is little air or where the only shelter provided is a so-called house the inside of which must be like a Dutch oven. Properly constructed houses with plenty of head room and air space should be provided. It may be urged that tenants will

not go to the expense of erecting such houses. The answer to this is that portable houses can easily be built, which can be removed by the tenant, as they are not "fixtures." Sun shelters should also be provided, and both these and the houses should be given two coats of limewash, or of any of the patent roof-cooling materials on sale. It is high time that the sanitary authorities, and perhaps the Society for Prevention of Cruelty to Animals, took this matter in hand. The action of certain local authorities in compelling owners of poultry to tar pave the poultry yards is not to be commended. The proper remedy is the adoption of scratching-shed houses of proper construction.

THE YOUNG STOCK.

I have recently inspected a number of the poultry plants belonging to leading utility breeders. In due course I hope to visit many more, including those of the local breeders. It is gratifying to record that these plants are generally conspicuous for good housing, and the feeding and breeding methods are excellent. The results of the season have been good, and many thousands of fine cockerels and pullets were to be seen. More satisfactory still is it to learn that the owners are well satisfied with results to date and with future prospects.

Pullets should be kept growing, but should not be forced, little if any animal food should be given them, but green food in abundance is to be recommended. Change the birds from yard to yard every two or three weeks. If they can have liberty or free range for a time it will be advantageous. Use every endeavor to prevent too early laying. Early laying stunts the growth and also results in eggs of very small size. The pullets should be well grown and robust before laying begins. The tendency in this climate is towards early laying. There is no need to encourage this trait. Where fowls are scientifically bred for egg production, and in addition, are well housed and fed, they will lay quite early enough.

For laying competitions the pullets which will compete are among the latest hatched, and probably about two and a half months old at time of writing. In previous years the trouble with most breeders has been in preventing their competition birds from laying before they are sent to the poultry stations on March 31st.

The Cockerels.—All surplus cockerels should be fattened and disposed of, so that more attention can be paid to those reserved. The White Leghorn cockerels are often a great nuisance on account of their fighting propensities. It would pay our stud breeders to erect small cockerel coops—rather larger than show pens—in which to house the cockerels while final selections are being considered. Beginners are advised to adopt this plan, because often, through inexperience, the best birds in the yard are sacrificed.

DUCKLINGS.

At the time of writing forward ducklings are commanding excellent prices on the markets, and breeding results must have been very profitable. Those not disposed of should be housed in cool structures, as hot yards exposed to the sun result in great mortality. Ducklings should be provided with drinking water day and night. On hot days it is a good practice to provide shallow pans of water in which green food is placed; this they will eat when all other food is refused.

VERMIN.

Breeders who adopt modern methods are not much troubled with vermin. The male birds are disinclined to use the dust bath, and may become badly infested. The quickest method is to dip such birds, and repeat the process in a week or 10 days, when any eggs not destroyed will have hatched. Single birds may be treated with kerosine one part, olive oil three parts. Feather mites often become troublesome, and some sorts are of microscopic dimensions. Dipping will generally eradicate these, and many of the sheep dips on the market are good. These feather-eating or depluming mites are, by some authorities, held responsible for promoting the vice among fowls known as feather-eating. Later on an illustrated article will be given dealing with these pests. Ticks must be eradicated according to law. Breeders will save themselves and the poultry inspectors trouble if they eradicate this pest, if on their premises, without waiting for official pressure to do so.



THE POULTRY INDUSTRY IN 1912.

By D. F. LAURIE, Poultry Expert and Lecturer.

A BRIEF RETROSPECT.

On the whole, the year 1912 has been an extremely satisfactory one for the breeders. The financial aspect is always the most interesting and, therefore, the most important. In dealing with primary productions the question of markets and prices is of first importance, for skill in rearing approved stock and in the production of heavy yields of eggs go for naught unless the financial returns are good. The causes of the extremely satisfactory prices for eggs and table poultry during 1912 are many. Eggs now are quoted in the markets at just double the prices they were in 1905—seven years ago. Production has increased and so have the inter-State exports; there are also more people, but the population has not doubled in the period. Good cockerels have throughout the year realised prices that would have been ridiculed as unlikely seven years ago.

The egg-laying competitions continue to increase in popularity, and the results are gaining world-wide recognition, and are advertising the State in a far more thorough manner than most people imagine. At Roseworthy a world's record for one year's production of eggs from a pen of six hens was made, viz., 1,589 eggs from six hens—an average of 264·8 eggs per hen. This fact is known in every part of the world where fowls are kept by civilised people.

At Kybybolite the excellent scores have demonstrated the importance of housing in a manner suitable for cold, wet localities. These results are attracting attention even in England, where the importance of good housing is not sufficiently recognised.

The poultry stations at Murray Bridge, Kybybolite, and Roseworthy continue to attract great attention and are inspected by thousands of people. The methods adopted, both in housing and feeding, are copied by breeders. In a large correspondence practically every writer states that he feeds on the method in vogue at the poultry stations. The year's results have been good. Roseworthy in particular has had a good year and finishes with 750 odd forward pullets and about 500 more which will lay in March and April. The early hatched pullets began to lay in September. Early autumn hatching has proved a financial success again and will in future be the rule. For the

average man the poultry stations are difficult of access. Most of the breeders are in the suburbs or near to the city. Farmers and others who come to the city cannot spare a day to visit Roseworthy. A central station would have greater educational effect.

Table poultry in limited quantity and of medium quality only was available for export to England. With local markets so good it is not proposed to continue the export trade for some time. If the local market continues to offer such inducements there should be a revival in table poultry breeding. In due course some of the larger plants will establish a table poultry breeding section. The small breeder with limited accommodation finds egg production easier. When it is understood that table birds can be bred for market in the long scratching shed houses just as well as those for egg production, there will be a revival. By this time every breeder should know what to breed for market, as there are so many breeds to choose from. For the export trade quality is the main point; but for the local trade any fat, heavy, young birds will command as good prices as the best. The general public is not fastidious as to quality and, therefore, the way of the breeder is much easier. It is opportune to remark that there is a great scarcity in breeding stock suitable for table bird production. True, there are a good many breeders of show birds, but the prices are beyond the pockets of the utility man. Some objection was taken to the sales of eggs and stock of Orpingtons, Wyandottes, Indian Game, and Faverolles at the Government poultry stations. It was asserted that the breeders could supply all demands. To allay such feelings among the breeders the fine stocks of these breeds were, as opportunity offered, distributed throughout the State. There is still a big demand which apparently cannot be satisfied. The demand is for utility stock, not for show stock, although the prospective buyers will not have the mongrels one so often heard of recently. They require typical birds, but bred more for utility than for show. The splendid markets offer such inducements that breeders should produce all they can. There is no need for Government help. Breeders know that as long as the poulterers will buy any sort of bird there is no need to produce the first class birds which alone are fit for export. Among the best varieties to breed are Wyandottes, White Orpingtons, and Rocks. I believe the Rhode Island Red will become a popular and valuable fowl in due course.

NEW BREEDERS.

Better housing and larger poultry plants are becoming the fashion, and during the year the staff has been exceptionally busy designing and advising as to the erection of houses and yards. In addition to the suburban breeders, a good number of farmers in different localities are erecting modern poultry buildings; some even are adopting my latest plans of housing. At the time of writing three large poultry plants are in course of erection near to

the city. These will each eventually carry from 3,000 to 5,000 layers. Numerous small plants are also being erected, and it has been a busy time supplying sketches and lists of materials. It should be understood that, in addition to good experience, a fair amount of capital is required to establish a plant large enough to give good returns and sufficient to satisfy moderate ambitions. As a result of these new plants there is a great demand for mature breeding stock, and breeders report most excellent business and depleted stocks.

INSTRUCTION.

A great part of a large departmental correspondence is in the nature of instruction. Numerous breeders in the country write regularly stating their troubles, requirements, and results of operations. This branch of the work is increasing and includes a large number of breeders in all the States and New Zealand. Judging by the letters, the results are satisfactory. The demand for bulletins and other publications is very great, and results in steady exhaustion of the large supplies printed for distribution. The course of lectures at the School of Mines was well attended, but breeders generally would lighten and assist my work if they attended in greater numbers. It would appear as if breeders think it derogatory to attend lectures, and yet they bring their troubles to a busy man and take up an hour or so of valuable time over matters which have been thrashed out at the lectures. I trust my many friends in need of advice will take the hint, and should a further course of lectures be given it is hoped they will attend in such force as to help demonstrate the importance of the industry in the suburban areas.

To all, and especially country breeders, I cordially offer my services as advisor, and trust that letters will flow in in increased numbers, so that the industry may be advanced.

Country breeders and secretaries of institutes, bureaux, &c., are reminded that I am always ready to arrange for a lecture. This fact is well known and availed of in some localities, but in others there is misconception.



EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended Dec. 31st.	Total Eggs Laid from April 1st, 1912, to Dec. 31st, 1912.
SECTION I.—LIGHT BREEDS.		
WHITE LEGHORNS.		
Cowan Bros., Burwood, N.S.W.	99	1,047
Tabuteau, J. O., Black Rock, Melbourne	102	876
Hodges, H., Pymble, Victoria.....	126	951
The Range Poultry Farm, Toowoomba, Queensland	98	938
Brundett, S., Moonee Ponds, Victoria.....	132	998
Jessup, W. C., Caulfield, Victoria	138	915
Dawes, J. H., Granville, Sydney.....	118	1,038
Beadnall Bros., Gawler	134	1,057
Redfern Poultry Farm, Caulfield, Victoria	139	881
Kerr, R., Longwood, S.A.....	119	1,052
Eckermann, W. P., Eudunda	115	976
McNab, J. A., Sandringham, Victoria.....	97	855
Mazey, P., Alberton	86	719
Broderick, P. J., Gawler	112	816
Redfern Poultry Farm, Caulfield, Victoria	121	859
Braund, J. E. and H. J., Islington	118	833
Dunn, L. F., Keswick	130	886
Hocking, E. D., Kadina.....	128	891
Groom, E., Peterhead	120	843
Pope, R. W., Heidelberg, Victoria	135	1,032
Haimes, T. F., Fullarton Estate	107	791
Provis, W., Eudunda	107	881
Burton, W. S., Moonta Mines	112	875
Broster, G., Mallala	141	938
Brain, J. H., South Yan Yean, Victoria.....	113	899
Sargenfri Poultry Yards, East Payneham	142	1,073
McKensie, H., Northcote, Victoria	133	1,014
McDonnell, J., Greytown, Rosewater.....	125	941
Browne, A. R., Hawke's Bay, N.Z.....	119	1,016
Brain, J. H., South Yan Yean, Victoria	108	802
Marsden, C., Welland.....	96	693
Hutton, C., Parkside	82	791
Miels, C. & H., Littlehampton.....	109	795
Moritz Bros., Kalangadoo	115	937
Codling, H., Mitcham Park	119	764
Troughbridge Poultry Yards, Edithburg, Y.P.	104	810
Irvine, A. W., Epsom, Auckland, N.Z.	92	819
Walker, P., Hicksborough, Victoria.....	106	842
Lampe, B., Kadina	108	657
Waite, F. J. O., Nailsworth.....	120	976

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Dec. 31st.	Total Eggs Laid from April 1st, 1912, to Dec. 31st, 1912.
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SECTION I.—LIGHT BREEDS—*Continued.*WHITE LEGHORNS—*Continued.*

Badeock, G., Mile End	120	804
McClelland, A., Mordialloc, Victoria	112	724
Tomlinson, W., Clarence Park	131	878
Roberts, L. L., Kadina	131	891
"Strathcona," Long Plain	124	912
Whitegate Poultry Farm, Deepdene, Victoria.....	101	839
Purvis, Miss Gracie, Glanville	124	921
Padman, A. H., Hyde Park	113	932
Sickert, P., Clarence Park	125	935
Purvis, W., Glanville.....	120	923
Rice, J. E., Cottonville	113	1,008
Hamill, H., Kogarah Bay, Sydney	130	858
Gurr, W. E., Kapunda	122	847
McLeish, E., North Adelaide.....	126	865
Craig Bros., Hackney.....	111	874
Uren, Mrs. P. A., Kapunda	93	1,132
Perry, Wm., Murrumbidgee, Victoria	115	806
Nancarrow, J. T., Port Adelaide	97	687
Bertelsmeier, C. B., Clare	107	912
Tockington Park Poultry Farm, Grange.....	98	921
Trenwith, T. H., Kadina	128	784
Knappstein & Bray, Clare	115	777
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	116	853
"Deneshollow," Caulfield, Victoria	109	808
Hill, Chas., Monarto South	70	574
"Islay," East Malvern, Victoria.....	125	822
Cosh, A. J., Burnside.....	128	946
Indra Poultry Farm, Freeling	98	803
Whitrow, A. J., Knoxville	94	847
Hall, T. C., Rose Park	104	854
Ontario Poultry Farm, Clarendon.....	112	870
Howlett, H., Moonta	100	816
"Koonoowarra," Enfield	90	891
Hall, A. W., South Oakleigh, Victoria	147	1,027
Convent of the Good Shepherd, Oakleigh, Victoria	116	783
Carne, E. A., Kangaroo Flat, Victoria	129	906
Navan Poultry Farm, Minlaton	120	751
Lillywhite, R. G., Fullarton	131	928
Gibbs & Pine, Queenstown	121	657
Hughes, J. J., Elsternwick, Victoria	121	761
Shamrock Poultry Farm, Perth, W.A.	103	757
Bertelsmeier, C. B., Clare	129	860
Nancarrow, J. T., Port Adelaide	111	880

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Robertson, F. H., Northam, W.A.	82	613
McKenzie, E., Northcote, Victoria	103	626
Mitchell, B., Bendigo, Victoria	86	604
Provis, W., Eudunda.....	78	687
Kenway, D., West Pennant Hills, Sydney.....	89	790
Cowan Bros., Burwood, N.S.W.	90	823
Kenmore Poultry Farm, Dandenong, Victoria	86	676
Brundett, S., Moonee Ponds, Victoria.....	89	722
Cant, E. V., Richmond	94	745

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended Dec. 31st.	Total Eggs Laid from April 1st, 1912, to Dec. 31st, 1912.
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SECTION II.—HEAVY BREEDS—Continued.

BLACK ORPINGTONS—Continued.

Craig, Mrs. C., Hackney	81	681
Lampe, B., Kadina	78	649
Wirraparinga Poultry Yards, Plympton	94	636
Phillips, A., Portland, S.A.	99	654
Martin, B. P., Unley Park	99	846
Nancarrow, J. T., Port Adelaide	54	409
Padman, J. E., Plympton	72	755
Francis Bros., Fullarton	101	613
Hall, T. O., Rose Park	83	762
Tockington Park Poultry Farm, Grange	78	647
Bertelsmeier, C. B., Clare	83	698
Craig Bros., Hackney	92	799
Bertelsmeier, C. B., Clare	76	673

SILVER WYANDOTTES.

Dunn, L. F., Keswick	104	845
Tidswell, H. J., Mitcham Park	62	655
Moyes, S., Blyth	74	625
Perry, Wm., Murrumbena, Victoria	84	633
"Denehollow," Caulfield, Victoria	84	697
Western, F. C., Marion	73	780

SALMON FAVEROLLES.

Courtenay, K., Mordialloc, Victoria	84	746
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LANGSHANS.

Stevens, R. F., Littlehampton	101	819
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PLYMOUTH ROCKS.

"Koonoowarra," Enfield	98	695
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SECTION III.—SCRATCHING SHED SECTION.

WHITE LEGHORNS.

Sickert, P., Clarence Park	135	982
Tomlinson, W., Clarence Park	130	1,041
Movits Bros., Kalangadoo	141	858
Codling, H., Mitcham Park	119	799
Sargenfri Poultry Yards, East Payneham	134	858
Purvis, W., Glanville	115	835
Bertelsmeier, C. B., Clare	118	621
Padman, A. H., Hyde Park	128	1,010
Hocking, E. D., Kadina	120	843
Beadnall Bros., Gawler	121	807
Brain, J. H., South Yan Yean, Victoria	85	637
Provis, W., Eudunda	119	910
Bedfern Poultry Farm, Caulfield, Victoria	126	944
Broderick, P. J., Gawler	124	815
"Koonoowarra," Enfield	113	766
Lillywhite, R. G., Fullarton	121	852
Coch, A. J., Burnside	110	777
Indra Poultry Farm, Freeling	112	834
Whitrow, A. J., Knoxville	132	859
Tockington Park Poultry Farm, Grange	112	898

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended Dec. 31st, 1912.	Total Eggs Laid from April 1st, 1912, to Dec. 31st, 1912.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	134	1,034
Dow, A., Glencoe West	107	941
McNamara, Mrs., Mount Gambier	91	826
Moritz Bros., Kalangadoo	143	1,170
"Mahama," Mount Gambier	139	955
Holmes, F. A., Frances	135	1,013
Sudholz, A., Kalangadoo	99	808
Stanton, S., Naracoorte	111	781
Hall, C. W., Mount Gambier	79	889
Moritz Bros., Kalangadoo	130	1,037
Vorwerk, K. E., Millicent	148	988
Vorwerk, H. F. & A. C., Millicent	129	962
Jarrad, J., Mount Gambier	131	936
Bartram, T. A., Kybybolite	97	984
Vorwerk, H. F. & A. C., Millicent	88	747
Jenkins, R. D., Kybybolite	124	781
Arthur, J. S., Bordertown	106	837
Drake, C., Naracoorte	91	876
"Eurinima," Kybybolite	112	968
Smith, M., Hynam	141	881
Lacey, F. C., Kybybolite	131	1,151
"Herdfield," Mount Gambier	151	1,116
Blue Lake Poultry Farm, Mount Gambier	124	847
Beaton, W. J., Tantanoola	131	938
Bennett, E., Kalangadoo	120	779
Jones, H. F., Mount Gambier	110	810

MINORCAS.

James, S. T., Mount Gambier	123	665
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdfield," Mount Gambier	135	899
Blue Lake Poultry Farm, Mount Gambier	55	531
McNamara, Mrs., Mount Gambier	74	483

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	62	668
Osborne, W. F., Kalangadoo	43	732

PLYMOUTH ROCKS.

Bishop, R., Mount Gambier	100	558
Glenelg River Poultry Farm, Mount Gambier	54	548

D. F. LAURIE, Poultry Expert.

NOTES ON EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

With returns for the month of December to hand satisfactory results for the third quarter are shown, and although seasonal effects will result in more or less erratic laying, the final records should be excellent. At Roseworthy, in section 1, 11 pens and in section 3, two pens are over the thousand mark. The leading pen has 1,132 to its credit. At Kybybolite six pens have passed the thousand, and the leading pen with 1,170, and the second with 1,151 are establishing a good name for the test. It is, of course, too soon to forecast probable results, and that pastime may safely be left to the dreams of prospective winners. While it is satisfactory to note the excellent egg production of the birds it is necessary to call attention to the fact that errors in breeding are showing prominently. Broodiness is far too prevalent among White Leghorns. I have repeatedly advised breeders to discard from the breeding pens all females which have shown the slightest sign of broodiness. This method, if adopted, will do much to eliminate this undesirable factor. It is within my knowledge that some breeders disregard this view under the mistaken idea that slight broodiness is of no great moment. The least sign is a decided taint and will increase in subsequent generations. Weakness in the organs of reproduction is in a measure a hereditary defect, and my advice is to discard from the breeding pen any hen which has had trouble in laying. The evidence in support of this view is amply sufficient. The aim of all breeders should be to improve their stock in every direction. We have splendid poultry stocks in this State, and seasonable warnings will help to keep up and further improve the standard.

ROSEWORTHY.

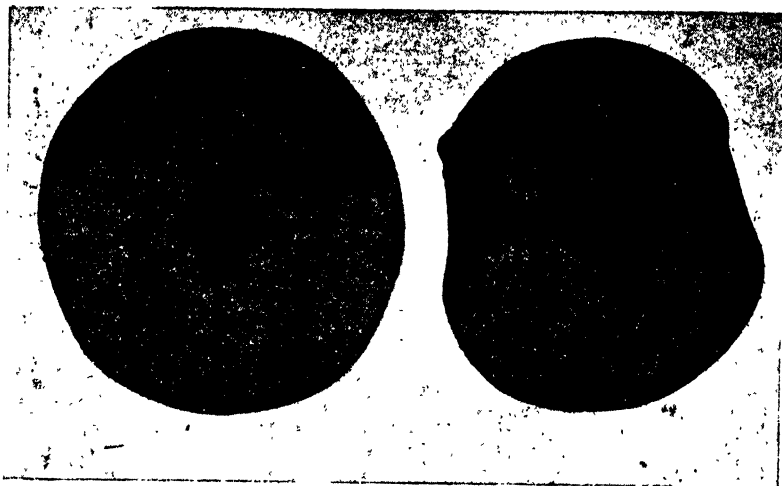
The Superintendent reports—The health of the birds is good. A few birds are showing first signs of moulting; these are rather later than on previous occasions, probably owing to a rather protracted spell of moulting during May and June. Two deaths were recorded in section 2, one Black Orpington (no apparent cause) and one Faverolle during excessive heat. One hen died in section 1 from oviduct troubles. Broodies have been recorded as follows:—Section 1, 75; section 2, 130; section 3, 19; a total for the month of 224. This trouble alone is sufficient to cause a considerable decrease in number of eggs laid. The laying has eased off somewhat, but averages are still ahead of corresponding period of last year, notwithstanding the increased number of birds. The leading pen is fast losing the pronounced lead which was established earlier in the year, and the prospects of its putting up a big score are not nearly so promising as they were. The few hot days experienced during the middle of the month had a marked effect on the birds and seemed to cause a check in the laying, which it will be difficult to make up. The average maximum temperature for the month was 84.1°, the average minimum 50.1°, the three hottest days being 104.2°, 107.3°, 108.1°, and the lowest reading showing 38.7°; these readings are taken at 9 a.m. Rain fell on six days in quantities from 1 to 20 points, with a total of 82 points. Light wind, chiefly from the south-west, was recorded on 14 days. The inter-State birds are looking and doing well, and with one or two exceptions bid fair to finish high on the scoring sheet. The eggs laid by each section and grand totals are as follows:—Section 1, 9,555; total, 72,419. Section 2, 2,641; total, 21,506. Section 3, 2,415; total, 17,236. Total for month, 14,611; grand total, 111,161.

KYBYBOLITE.

The Superintendent reports—Nine months of the test have passed and the birds will now commence to vary in their laying, but with a score of over 1,150 for leading pen with three months to go is very satisfactory. Various pens should finish up around the 1,500 mark, which, though a long way from a record, is also very satisfactory. The laying of the first three pens is very creditable, considering that these competitions have only been held in the South-East for three years, and as the first test was won with 1,100 odd, the value of the test is evident. The weather has been unseasonable for December; only a few hot days were experienced and a good deal of rain fell. The maximum temperature was 96° with a minimum of 41°. Wind, more or less strong, was registered on 19 days. The general health of the birds has been good, no deaths having occurred. In section 1, 12 birds had to be removed for broodiness, while section 2 added 26 to the broody pens.

D. F. LAURIE, Poultry Expert,

APPLE—ROME BEAUTY.



FRUIT.

Size—Medium to large, good specimens measuring $3\frac{1}{2}$ in. wide by $3\frac{1}{4}$ in. high. *Shape*—Roundish conical to round. *Color of Skin*—Yellow, shaded with bright red and striped with dark crimson red, and over all a sprinkling of light dots. *Eye*—Partially closed, set in a moderately deep and ribbed cavity, calyx lobes erect convergent. *Stamens*—Marginal in position on tube, which is short, funnel shaped. *Stalk*—Long and slender, set centrally in the bottom of a deep regular conical-shaped basin, the skin of the walls of which is smooth and almost invariably of a clear or russety-green color, which does not extend out of the basin. *Flesh*—Yellowish, and of a brisk sweet acid flavor before mealiness sets in. *Seed cells*—Slightly obovate and axile.

TREE.

Habit—Upright and vigorous when young, but with a distinctly pendulous habit after the fruiting character has become established. The bark of the hardening wood is dark-red and shiny. The shoots when quite young are thickly covered with downy hairs which, disappearing, expose a few yellowish dots upon dark bark. These dots are often in close groups. The leaves are medium to large in size, deep-green in color, with prominent pale midribs and veins, the marginal edges being distinctly serrated. The bark of the mature wood is dark-grey. The tendency of the tree is to produce moderately long laterals, which form fruit spurs and set fruit upon the terminal points only, leaving the other buds undeveloped. These laterals are usually widely distributed upon the main branches. These laterals may be shortened back



ROME BEAUTY APPLE.

A. Vaughan, Govt. Photographer

to a few inches in length the season after they have fruited, and some of the apparently undeveloped buds usually push out into spurs. If this is not done judiciously the tree becomes too tangled and willowy in habit. The leading shoots should be pruned regularly each winter for several years after planting, to stiffen framework. *Liability to disease*—Inclined to be injured by fusicladium, but apparently free from the ordinary spotting form of bitter pit, though "crinkle" sometimes affects the calyx end. *Climatic and Soil Conditions*—In this State the Rome Beauty has probably the widest range, proving satisfactory in both the warm and cool temperate regions, reaching, however, its best size, color, and flavor in the clay and shaly soils of the ranges to the south of Adelaide receiving a rainfall of about 30in.-35in. *Season*—Blooms very late, after most sorts are finished, illustrated by embryo fruits being scarcely ready for the first spraying against codlin moth when other popular kinds receive their second dressing. It hangs so late on the trees that for this pest it needs a final spraying in February. To secure the best flavor the fruit should hang until March, and even well into April here, otherwise it wilts and toughens in the store. It keeps in good crisp flavor in an ordinary storage room until July, but afterwards, though retaining its fine appearance, becomes mealy and lacking in quality. It is valuable for kitchen or dessert purposes, and is improving in local estimation. *Origin*—Southern Ohio, U.S.A.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, December 11th, there being present Mr. A. M. Dawkins (Chairman), Professors Lowrie and Perkins, Col. Rowell, Messrs. G. R. Laffer, F. Coleman, J. Miller, C. J. Valentine, G. F. Cleland, and G. G. Nicholls (Secretary).

REGISTRATION OF STALLIONS.

The resolution from Congress favoring the compulsory registration of stallions, and a uniform Stallion Licensing Bill throughout the Commonwealth, with a proviso that the registration should not take effect until 1915, was considered. It was decided to transmit the resolution to the Minister of Agriculture, and also to refer it to the various Branches, in accordance with the request from Congress.

BURNING SCRUB AND STUBBLE.

The following resolution from the same source was dealt with :—"That district councils be empowered to fix the dates as well as the hours for burning stubble and scrub in their respective districts." Also a resolution from the Hills Branches Annual Conference, supporting the same. It was mentioned that, in the opinion of the Hills members, if some provision such as that now sought had been in existence, the disastrous fires which occurred in the hills last summer could have been prevented. The urgent need for some authority to burn breaks under supervision during a fire, to check its progress, was emphasised. It was decided to refer the matter to the Minister for consideration, with the Board's indorsement of the resolutions.

CARRIAGE OF STUD STOCK.

A request was received from the Willowie Branch that the Board should obtain the opinions of the other Branches relative to the advisableness of securing a reduction in the railway freights for stud stock. It was pointed out that at present stud stock were carried at the same rates as other cattle, and the Board decided that it would be unwise to seek any alteration.

COUCH GRASS.

The Berri Branch asked that the Board would do all in its power to have couch grass declared a noxious weed in the Berri Irrigation Area. In view of the fact that the Noxious Weeds Act was practically inoperative, and that seeds of this grass would always be carried on to the land in the river water used for irrigation, the Board was unable to comply with the request.

ASSISTANT VETERINARY LECTURER.

The Kalangadoo Branch intimated that at a recent meeting it had been decided to ask that an assistant veterinary lecturer for the district between Adelaide and Mount Gambier should be appointed. The Board decided to refer the matter to the Director of Agriculture.

FEEDING DOWN PEAS.

The Penola Branch desired advice and information regarding the feeding of peas to sheep. Professor Perkins said when the peas were grown for grazing he preferred to feed them down when the pods were quite green. The land then would be well cleaned for the ensuing crop. When the feeding was done early and rain followed there was often a second growth. Leaving the peas to ripen before feeding down invariably resulted in the subsequent crop being dirty. Mr. Coleman said that in the Saddleworth district peas were fed off when dry, and many farmers successfully topped off their stock in this way before marketing. Professor Lowrie considered it was well to allow the peas to get fairly ripe before putting the sheep in. By that time there would not be much other feed suitable for fattening available. It was true that the land afterwards generally carried plenty of weeds, but the

eradication of these should not prove to be a serious problem, in view of the fact that pea stubbles were always loose, and easily worked, and the roots of most of the weeds were near the surface. On the suggestion of Professor Lowrie, it was resolved to send circulars to the Branches in the districts where peas were grown extensively, inviting the members to relate their experiences in connection with the fattening of sheep on peas.

EXPERIMENT FARM WANTED.

The Petina Branch communicated a wish that certain land in the neighborhood should be reserved by the Crown, with the object of preserving the native timber upon it and the planting of other timber, and for the establishment of an experiment farm on the balance. It was mentioned that an experiment farm was badly needed in that part of the State, which was 150 miles from the nearest institution of the kind, and more or less typical of 1,000,000 acres of land which shortly would be thrown open in the district. On the motion of Mr. Laffer the Board agreed to forward the request for a forest reserve to the Commissioner of Crown Lands, with a recommendation that it was highly desirable that everything possible should be done to encourage afforestation.

A NEW BRANCH.

Approval was given to the formation of a Branch of the Bureau at Blackwood, with the following gentlemen as members, viz., Messrs. E. Ashby, P. H. Williams, D. Williams, W. Gamble, T. C. A. Magarey, A. W. Magarey, A. A. Magarey, G. F. Dall, F. Dall, A. W. Carlos, J. Turner, H. E. Sibley, A. A. Philips, R. J. Wilson, W. Adey, A. J. Penno, T. Hunter, W. H. Wickens, F. Andrews, J. Nicolle, R. H. Hewitt, C. G. Savage, W. L. Summers, R. Eglinton, C. Shearer, O. H. Nootnagel.

NEW MEMBERS.

The following gentlemen were approved as members of the undermentioned Branches, viz. :— Lyndoch—E. Hausler, W. Kies, H. O. Koch ; Naracoorte—W. H. Smith ; Bute—B. Lamshed ; Clare—L. A. Davies, J. Thomson, S. Waters, C. Pink ; Morphett Vale—E. C. Rainsford ; Greenock—F. W. Nitschke, E. Roenfeldt, W. Nenke ; Mount Barker—J. F. Moore ; Coorabie—W. Gribble ; Lyndoch—R. W. Dunstan, J. Caldecott ; Moonta—H. S. Bennett, W. J. Brinkworth ; Pinnaroo—R. P. Allen, H. Venning ; Meadows—B. Usher ; Monarto South—C. H. Zeunert ; Wepowie—T. M. Walker ; Mount Remarkable—C. F. Packard ; Naracoorte—R. A. Jenkins, T. B. Daniels ; Orreroo—J. B. McDougall, H. P. Baldwin, D. McLean, J. H. Nutt, C. R. Macdonald, L. Haynes, E. Langton, S. Chandler ; Hooper—F. Koster.

LIFE MEMBERSHIP.

A request for appointment as a life member was received, but as the gentleman whose name was submitted had not been a member of the Bureau for 20 years the Board felt unable to grant the request of the Branch.

BERSEEM, OR EGYPTIAN CLOVER.

SOME FAVORABLE REPORTS.

The berseem seed (*Trifolium alexandrinum*) imported by the Department of Agriculture last year, and sown in many parts of the State by farmers and other landholders, had to contend against adverse circumstances in a season in which the autumn rains were exceptionally late. Where irrigation was not practicable the young plants were unable to get sufficiently well established to continue growth during the cold months, and consequently many of the reports received indicated that the plants were dormant and had turned yellow, and that the berseem, in such a season as this, could lay no claim to value as an early fodder. A few notable exceptions were those instances in which the seeds had been sown in early April and had been irrigated until the winter rains fell. Latterly, however, reports have come to hand of some splendid crops of this clover. Below, two instances of these are given, one with and the other without irrigation :—

Mr. F. H. Heinrich, of Freeling, writes—“ I put the seed (28lbs.) in three-quarters of an acre of land on the 27th March, having previously watered the ground sufficiently with a sprinkler to cause germination. This occurred within three days, but as the rain held off I found it necessary to continue watering from time to time until the first rain in June. I commenced cutting the first crop during the first week in June, when it was from 15in. to 18in. high. The subsequent crops grew very rapidly and without any more watering until the beginning of November, by which time I finished cutting the fourth crop. The second, third, and fourth cuts were each about 2ft. high. I have just finished cutting the fifth crop, which, of course, had been watered. I find that it does not stand the hot weather too well, due, no doubt, to the fact that it does not root very deeply. I should think that in a normal season three crops could be produced without watering. It grew most vigorously during the wet cold months, although I believe it is desirable to sow it early in the season when the ground is still warm in order that it may germinate quickly. I had ploughed and cultivated the land during the summer months after taking off a crop of barley, but I put on a dressing of about 15 tons of stable manure per acre. I found it excellent fodder for my poultry, cow, and horse, all being especially fond of it; in fact the stem is so succulent that the poultry eat that as well as the foliage. Fed to cows it does not

taint the milk in the slightest degree. It does not matter at what stage it is cut."

Mr. H. N. Bell, of Mount Barker, reported in August that the seed was sown on June 7th. The germination was exceedingly good. The seed was put in land on which potatoes had been grown. The fertiliser used for the potatoes was 1cwt. bonedust per acre, a strip broadcast and a strip in the furrows. No manure was put in with the berseem, but where the bonedust was broadcast for potatoes the growth of berseem was much better than where the manure had been put in the furrows. From the time of sowing till August 15th there were about 30 frosts, several of them being very severe (5° to 7° of frost). The plants grew very slowly and turned red, but in August were 2in. or 3in high and of a nice green color. On December 10th, Mr. Bell wrote that the subsequent growth of the berseem had been wonderful. Early in November he had cut it for hay, and now, after five weeks' growth, was cutting as green feed for cows and pigs a crop about 20in. high. Where it had been cut six days before it was already 3in. to 4in. high.



FOOT-AND-MOUTH DISEASE.

By PROFESSOR B. BANG, Copenhagen.

The following article, reprinted from *The Journal of the Board of Agriculture*, is substantially a paper read by Professor Bang before a meeting at the Royal Veterinary and Agricultural College. It contains, however, some emendations and additions made by Professor Bang at the board's request :—

Foot-and-mouth disease is an acutely infectious disease which chiefly attacks ruminating animals and pigs. It is said also to infect horses, dogs, and cats, and even poultry, but such cases are extremely rare and have probably never occurred in this country. Man is attacked occasionally, but, fortunately, not often; to children of tender age the disease may be fatal. Cattle, pigs, and sheep are the animals which are most affected by it.

SYMPTOMS OF THE DISEASE.

From three to six days, as a rule, elapse from the time of infection (but in some cases from two to 10 days, and in the case of the pig only one day), before the animal sickens. It is a sort of exanthematic fever—akin to small-pox, measles, scarlet fever, and the like—that is to say, the disease begins with an ache throughout the system, and a fever, which after one to two days is followed by an eruption. When this has come to a head the fever almost or entirely ceases.

The first symptom is, therefore, that the animal seems unwell, eats less, and, if it is a milch cow, gives less milk. The temperature rises at once to 40° or 41° C., or more in a cow, but this fever lasts only a couple of days, and in slight attacks it may be quite low. Vesicles or bladders begin to form in the mouth, and occasionally on the lips, snout, and nostrils, on the skin round the hoofs—in cattle mostly in the cleft between the hoofs, and in pigs mostly immediately above the hoof on the outside, and in the skin of the foot joint. In many cases the skin round the teats is also attacked, and occasionally eruptions occur in the vagina of female animals.

The eruption consists in the formation of surface vesicles, the epidermis or the epithelium of the mucous membrane being lifted up in many places by an exuded watery liquid. The vesicles are small at the start, but usually increase quickly in size; this is especially the case in cattle, and this fact seems to have some connection with the fact that the epidermis of these animals is very thick, especially between the hoofs and on the tongue, so that it offers great resistance against the exudation pressure. The acute exudation, of course, causes pain, with the result that the animal goes lame,

limps badly on the affected limbs, shakes its feet, lies down a great deal, and is unwilling to rise. Sheep and pigs sometimes creep about on their knees. Cows seem afraid to eat, keep the mouth shut, and make a loud smacking noise with their lips. Saliva forms in the mouth, and dribbles out in strings. If the cow's mouth is opened—a process which she is apt to resist—the vesicles above mentioned will be seen. They occur mostly on the surface of the tongue, especially on the flat part in front, but also on the thick part farthest back. The number of bladders or vesicles is not large as a rule, often only five to six, but frequently they increase quickly in size. They are usually the size of a shilling or a half-crown, and sometimes attain a couple of inches in diameter. Large vesicles are likewise often to be found in the fore part of the toothless gums of the upper jaw, and smaller ones on the inside of the lips, on the palate and cheeks, and less often on the under-side of the tongue. As the epithelium on the back of the tongue is very thick it cannot be determined at first whether it really is a case of vesicles, but the eruption takes the form of large flat lumps covered by an apparently normal epithelium. If one tears a hole in one of these lumps, a clear liquid comes out. The epidermis can be loosened for some distance (sometimes one can tear away a piece of "skin" a couple of inches in diameter from the front part of the tongue), revealing a red—often very red—sore which is very apt to bleed. This exposure of the naked mucous membrane causes the animal sharp pain, which it shows by shaking its head violently, and at times it is driven quite wild. A little later the bladders burst by themselves without any such interference, and the loosened epithelium is detached, leaving large red sores. Often, however, the epithelium remains hanging on to either side of the sore, and in its macerated whitish state is then apt to present some resemblance to a loose croupous deposit.

Approximately the same process takes place in the cleft between the hoofs. Here the bladders or vesicles mostly begin at the back, but, as a rule, they combine into one immense bladder, which extends throughout the length of the cleft, and after it has burst and shed the whitish-yellow "boiled" looking epidermis a large red sore is exposed.

On the teats the vesicles may at first be very small but numerous. Often there is an annular vesicle round the mouth of the teat itself. The eruptions when occurring on the teats often combine into large, flat, somewhat flabby, irregular vesicles of a whitish-yellow color. These are naturally easily torn in milking, and the epidermis soon cracks, as it is very thin at this point. The bladders are here also succeeded by reddish surface sores, which take some time to heal on account of the milking.

In other respects it may be said to be characteristic of the disease that it is very superficial. It amounts to a simple raising of the epidermis or epithelium of the mucous membrane caused by a serous exudation. There is no deeply rooted inflammation of the mucous membrane or corium; the

sore simply consists in the laying bare of the surface of these parts, and it has a natural tendency to heal quickly. In a case of a deep sore which destroys the corium or mucous membrane itself the healing may be effected by the sore being filled with granulations, and the final healing may take place very slowly through the epidermis gradually stretching out from the sides; but in foot-and-mouth disease there are always small patches of cellular tissue at the base of the sore (down between the papillæ of the mucous membrane), and the sore may therefore in a very short time be covered with newly-formed epidermis over the whole surface simultaneously. Thus it is found that these large sores can heal in eight days or less. The locality of the sore may, however, be traced for some time by a smooth, slightly depressed, thin-skinned patch, as, of course, some time elapses before the epidermis reaches its normal thickness.

Owing to secondary infection of the sore more severe inflammation may of course arise later, but this occurs extremely seldom in the mouth, especially when the animal is given suitable soft and clean fodder, whilst it is more apt to happen when the disease attacks the feet, especially the hind legs, and when the animal stands in manure or dirt mixed with urine, as, for instance, in dirty stalls without litter. Under such conditions deep gangrenous inflammation of the skin between the hoofs, sometimes even involving the tendons and joints—the malignant panaritium—is frequently met with, and is due to infection with the necrosis bacillus, which occurs so largely in manure. Other bacteria can, of course, also enter the sore and give rise to inflammatory processes.

The teat sores may, as above stated, become irritated by the milking, and they are also liable to be infected when the animal's litter is dirty, and deeper sores may thus be formed, which will heal slowly. But what is more dangerous still, bacteria may penetrate from the sores which frequently form on the tips of the teats into the lactiferous ducts and cause inflammation of the udder, which often leads to the destruction of one or more quarters.

Apart from these complications, which, under favorable conditions, and when the animal is well looked after, are not very frequent, the disease is usually not a dangerous one. The cow attacked by it is usually very ill for some days, eats little or nothing, gives little milk (which on the other hand contains more fat than under normal conditions), and becomes very emaciated; but about three to four days after the mouth complaint has begun she begins to eat well again, she grows fatter, and resumes giving a satisfactory amount of milk. The foot lesions often cause inconvenience a little while longer, but, given favorable conditions, these also heal surprisingly quickly, and most animals seem quite well again after one or two weeks.

Sheep and pigs usually have less violent attacks than cattle, and they are more liable to the foot disease than to the mouth disease, which often escapes notice. Pigs, however, often shed the entire horn of one or more hoofs, especially when affected animals are forced to walk.

NECESSITY FOR DRASTIC ACTION.

In these circumstances, it is not a very mild disease which it is hardly worth while making such a fuss about? This was the general opinion in the old days. It was not until 1875 that the disease was classified in Denmark as a "malignant infectious disease," for which the law requires that infected cases shall be rigorously isolated. Before that time the public authorities usually did very little to prevent the spread of infection, and, as a result, the disease showed great fluctuations, and was particularly prevalent in 1841-42 and in 1869-71.

It is quite natural that many a farmer whose stock has had the disease in a mild form thinks that the isolation is worse than the disease itself, but it is nevertheless with good reason that general opinion as to the economic significance of the disease has undergone such a remarkable change during the last 30 to 40 years. As a result it is now regarded as one of the most harmful diseases among domestic animals, and the greatest efforts are now being made to keep it in check, although, unfortunately, in many places with little success.

It is true that the mortality is mostly low, usually barely $\frac{1}{2}$ per cent. among adult animals, but young calves are very apt to die, and sucking pigs under 14 days nearly always die when the sow gets the disease; even when older, most sucking pigs die, and the survivors are very apt to be unthrifty.

There are many instances of the disease developing a very malignant character, with a mortality of from 5 per cent. to 50 per cent. among adult animals, and from 50 per cent. to 80 per cent. among young animals. Malignant epidemics of this kind are most apt to attack dirty and over-crowded farms, but they may also occur under favorable hygienic conditions. The disease may also occur in a very malignant form with numerous sudden deaths reminiscent of anthrax. Such epidemics have been observed in many different countries both in former and recent times. In 1839 2,000 head of cattle died in the Cantons of Berne and Fribourg in Switzerland; and in 1872, in the French Department of Nièvre, more than 20 per cent. of the calves and over 22 per cent. of the pigs were destroyed by the disease in the course of two months. In the summer of 1892 there died in Bavaria over 3,000 head of cattle, and in 1896 in Württemberg, 1,500. At Barcelona, in Spain, there died in 1901 50 per cent. to 70 per cent. of the young cattle. In Transylvania 711 out of 7,498 head of cattle, or 9.4 per cent., were destroyed in 1899. In Holstein and Schleswig the disease occurred last summer (1910) in a distinctly malignant form. According to Dr. Bugge, of Kiel, deaths occurred in practically all the large herds, and in many cases the loss amounted to 5 per cent. to 10 per cent. or over. Thus he mentioned instances in which five out of 20, 10 out of 80, 10 to 12 out of 100, and 10 out of 200 had died. In the September number of the *Landwirtschaftliches Wochenblatt* a tenant writes that eight out of his 80 cows had died, and that in two villages in the

neighborhood 25 and 15 cows respectively had been destroyed by the disease.

However, it is not these comparatively rare cases of great mortality that cause the chief trouble. It is the acutely infectious nature of the disease which makes it so serious. When it is left alone it spreads to an enormous number of farms, and with the present quick and easy means of communication it may quite easily extend to nearly all the farms of a country or province, with the result that the aggregate of numerous small losses represents in the end an enormous sum. Thus, the loss suffered by Germany in 1892, when over 1,500,000 head of cattle, over 2,000,000 sheep and goats, and over 400,000 pigs were reported to be infected, was estimated at over 100,000,000 marks (£5,000,000), and this year (1911) the loss is sure to be much greater.

This great loss is first and foremost due to the decreased secretion of milk. During the illness itself the yield of milk is nearly always greatly reduced, often to half the normal or less. However, as soon as the animal begins to eat again it usually rises, but it is only in exceptional cases, after very light attacks, that the secretion of milk again comes up to the normal.

Mr. Andersen, veterinary surgeon at Gimlinge, who in 1892-93 had charge of the disease in the part of south-western Sjaelland which suffered most from the disease, states in his report (*Maanedskrift for Dyrlæger*, Vol. X.) that many cattle owners claimed that they were 4-8lbs. short of milk per cow daily after the epidemic. Others reckoned that they only lost 2lbs. to 4lbs. daily, but even this small loss, if it continues throughout the milking period—which it usually does—will amount to a good deal of money. Andersen further writes:—"When a cow sickens six to eight weeks before she is due to become dry, at a time when yielding 10lbs. to 15lbs. daily, the dry period begins simultaneously with the disease." This is also an appreciable loss. Moreover, it is not unusual for a cow when attacked by the disease whilst dry to yield very little or no milk after calving, in spite of the fact that the udder is to all appearances healthy. The same may apply to cows calving whilst in the grip of the disease. Occasionally, according to Andersen, it is possible to work up the milk yield from such cows, but it seldom amounts to very much, say, one-quarter to one-half of the normal.

To this it may be added that in nearly all outbreaks some cows contract inflammation of the udder, with the result that many of these cows become more or less worthless for milking, whilst some cows get a malignant and persistent hoof complaint which weakens them greatly. Furthermore, a number of young calves and pigs die, as well as adult animals occasionally; abortion is also liable to occur; tuberculosis may sometimes suddenly attack a herd after it has been through foot-and-mouth disease—and all this without taking into account the emaciation caused by the disease (a matter of great importance when dealing with cattle fattened for killing).

It will be seen from the foregoing that it is hardly an exaggeration to estimate the economic loss from the disease at an average of 30 kroner (= 34

shillings) per cow. In Germany, however, the loss is put down at 50 marks (£2 10s.), and Dr. Remmelts tells me that the loss in Holland amounted to at least 25 gulden, or over £2 per cow.

To this must be added the fairly heavy expenses which are required for the proper care of the sick animals and the great loss which in many cases is the inevitable result of the isolation of stock, the issue of notices as to the boiling of milk, and the difficulties in connection with trading, which latter may be of the utmost importance to a country like Denmark, where the export of live cattle constitutes such a valuable item of commerce.

There is thus every reason for dreading the disease and doing everything possible to prevent its gaining a firm footing.

HISTORY OF FOOT-AND-MOUTH DISEASE IN VARIOUS COUNTRIES.

A study of the state of things prevailing in the neighboring country of Germany will be found very instructive when endeavoring to ascertain what may happen when the disease gains a firm footing. In that country it prevailed uninterruptedly for 20 years, from 1886 to 1905, and twice, in 1892 and 1899, it became terribly prevalent. I give below the number of cattle attacked : -

1886	5,000	1896	710,000
1887	12,000	1897	537,000
1888	37,000	1898	462,000
1889	262,000	1899	1,885,000
1890	432,000	1900	430,000
1891	394,000	1901	80,000
1892	1,504,000	1902	20,000
1893	204,000	1903	11,000
1894	93,000	1904	51,000
1895	195,000	1905	9,000

A like number of sheep and goats were attacked by the disease, but fewer pigs.

It will be seen that in the first few years the disease did not assume dangerous proportions, but after three years it spread rapidly, and after another four years it reached its first climax, then went down rapidly for a couple of years, but increased again and reached its second climax in the fourteenth year. After that the figures fell appreciably, and after one or two fluctuations the number of cases was gradually reduced to an almost insignificant figure. The Germans were naturally very gratified at this favorable result, which was attributed to the more stringent regulations imposed by the public authorities. After a short period of official freedom from the disease it again began to assert itself at the end of 1905, but in 1906 only 55 communes were attacked by it. Then the figure rose again, and in 1908 324 communes and over 18,000 head of cattle were affected. In 1909 the country was declared free again, but in December the disease reappeared. There is no doubt that during recent years it has been introduced into Germany from the neighboring countries, especially from Russia, where it seems to

have established itself permanently, and from France; but I cannot help thinking that negligence on the part of agriculturists, the concealment of cases of infection, and careless disinfection have had very much to do with it. When the disease is so well known agriculturists are apt to lose interest, and try to evade the inconvenience caused by the public preventive regulations.

During the past season a tremendous wave of the disease, probably the greatest epidemic that has ever taken place, has passed over the whole of Central Europe. At the end of May, 1910, it broke out in several districts of East Prussia, and simultaneously at Chemnitz in Saxony. It is said to have been introduced from Russia, and to have spread from cattle bought in a large cattle market in East Prussia. By degrees it extended from east to west over the greater part of the German Empire. In September, 1910, it was only to be found on 244 estates, but on July 1st, 1911, over 20,000 centres were affected, and on September 15th, 1911, 37,180 centres were affected, whilst the number of infected centres in November, 1899, when the disease last reached its climax in Germany, only amounted to 25,407. In the course of time the disease has gone back very much in the eastern provinces, but, on the other hand, it has gained a tremendous hold over the others. Thus, on September 15th there were 5,744 centres affected in Oldenburg, and 7,576 in the province of Schleswig (especially Holstein and South Schleswig). The first outbreak in the latter province occurred in January, 1911, and the disease was thought to have been introduced with affected sheep.

Austria and Hungary were also severely attacked by the disease at the same time as Germany, presumably also through infection from Russia. In these countries it has taken an even greater hold than in Germany. Thus, on October 4th, there were 111,382 infected centres in Austria, and on the 27th September 45,563 in Croatia and Slavonia. In Hungary the disease has been very general, but is now (1911) confined to 7,961 centres.

In France, 33,966 infected centres were notified in August, 1911, and in Belgium, on July 31st, 5,225 centres and over 50,000 head of cattle. In Holland 12,000, and at one time as many as 18,000 centres have been notified, and Dr. Remmelts informed me lately that in the western parts of the country hardly a single herd had been spared, whilst the infection in the eastern part was less prevalent.

In Italy over 18,000 animals were attacked during the week preceding the 6th August, 1911, in addition to 107,000 animals over from the previous weeks. These figures show clearly enough what a scourge to cattle this disease now is in Europe.

HISTORY OF FOOT-AND-MOUTH DISEASE IN DENMARK.

This is instructive in many respects. After the fairly severe epidemic in 1869 and 1870 had died away in the course of 1871, only occasional doubtful

cases occurred during the next few years, and in 1875, 1877, and 1878 there were a few series of cases, the nature of which, however, is also partly open to doubt. Thereafter we enjoyed complete immunity until the latter part of 1892, when the disease occurred almost simultaneously in the neighborhood of Skelskør, at Taasinge, and at Holstebro. Thence it spread fairly rapidly in south-western Sjaelland, and remained in this country until August, 1893. Altogether, however, only 398 holdings were attacked, comprising 10,843 head of cattle, 2,220 sheep, 32 goats, and 6,785 pigs. Of these 398 centres, 362 were located in Sjaelland and Møen, the distribution being as follows :— 233 in Sorø district, 61 in Copenhagen and the district of Copenhagen, 35 in Praestø district, 30 in Holbaek district, and three in Frederiksborgs district. In other parts of the country it appeared at different points, but only in isolated cases or in very small numbers ; thus only three centres were affected in Maribo district, five in Odense district, nine in Svendborg district, one in Randers district, ten in Aarhus district, seven in Ringkøbing district, and one in Vejle district—altogether 36 centres.

In no instance was it possible to determine in what way the disease was first introduced into the country—and this was also the case with later epidemics—but there can hardly be any doubt that it came to us from Germany, which was very badly ravaged during that year. I am inclined to connect the dying out of the disease with the introduction of a very careful system of disinfection of the railway wagons used for cattle transport, this disinfection having originally been very faulty.

Later, during the next few years, there occurred a few very remarkable recurrences on estates which the disease had attacked six months to a year previously. Thus it broke out on November 20th, 1893, on the Bjernedegaard Estate at Sorø, where it had made itself felt for the first time on November 16th, 1892 ; next on November 30th, 1893, at Dallund (Fyen), where it had occurred for the first time in May of the same year ; and on December 5th, 1893, at Rynkevang, near Kallundborg, where the first cases occurred on December 12th, 1892. Finally, on February 15th, 1894, it broke out on the Brorupgaard Estate at Slagelse, where it had occurred in March, 1893. At all four places all the cattle which had been born on the estate after the last attack were killed, and also all cattle subsequently added (respectively, 21, 4, 35, and, I think, about 40 head), whilst I let the greater part of the stock live—that is to say, all the animals which had been through the disease on the previous occasion, and all these animals showed themselves to be immune.

As during this period there was not a trace of the disease elsewhere in this country, and there could not have been any possibility of infection from abroad in any of the places mentioned (except through fodder, which is imported by all farms here), it must be assumed without a doubt that the infection had remained hidden on the farm from the previous attack. All

the houses were therefore subjected to a very thorough disinfection, and, especially at Brorupgaard, I remember that some rather expensive improvements were carried out in the woodwork of the buildings. Nevertheless, strangely enough, the disease returned a third time on this farm, on March 2nd, 1895, that is to say, over a year later. On this occasion all animals introduced to or born on the farm since the previous outbreak were also killed immediately, making 77 head of cattle in all, whilst I allowed all animals which had previously had the disease to live. They all proved to be immune, even those which had had the disease two years previously. The only possible explanation seemed to be, according to the farm people, that shortly before the appearance of the disease the cattle had been fed on hay which had been lying in the loft over the cowhouse since the previous outbreak. This hay was of course burnt, together with any other fodder which might possibly be thought to have been infected through the boots or clothes of the cow-man, and a large sum of money was also spent on rebuilding the cowhouse, from which all woodwork was removed and replaced by iron, stone, and cement. Since then the disease has not reappeared on this estate.

It is, of course, doubtful whether the infection was really lodged in the hay, but it will be readily understood that since then I have been very anxious not to leave any fodder which might possibly be infected on farms where cattle have been killed.

These four, or rather five, recurrences at the end of six months to a year show in each instance that the virus may possess much greater tenacity than is usually supposed. It is generally taught that the virus can be destroyed fairly quickly, say, for instance, after desiccation for 24 hours, and that it is fairly easily killed by means of ordinary disinfectants. But nevertheless, it has also been found that it may remain active in an attenuated condition for three to four months in hermetically sealed glass tubes, and this is further supported by the experience which we had this year in Jutland, where the disease in the neighborhood of Aarhus returned about three months after an outbreak and a few days after carting out the manure left from the stock which was first attacked. It is therefore advisable in practice to assume that the virus may persist for a very long time.

Of course it may be questioned whether the recurrences referred to may not be attributed to entirely different causes connected with what we have learnt in recent times about various contagious matters, as, for instance, in the case of human typhoid, where certain individuals, so-called "bacillus carriers," although apparently cured, nevertheless continue for years to give off virus, and may prove a great danger to the community as carriers of infection. In the case of foot-and-mouth disease, however, this hypothesis is controverted by the fact that I allowed the animals which had previously been through the disease to live, and that the disease nevertheless died out in the first three instances after the second outbreak and in the fourth instance after the third outbreak.

In another respect also my observations are very interesting. I refer to the question whether cattle as a rule acquire immunity by passing through the disease. On all the four farms this proved to be the case, and at Brorupgaard the immunity lasted two years. The text-books on the subject state that immunity is frequently acquired (some authors put it down at three to five or seven years), but that such immunity may in very many cases be of short duration; in fact, it is asserted that cattle are quite frequently attacked by the disease several times in the course of one year. It may, however, be safely assumed that these are rare exceptions; I firmly believe that immunity is the rule. Seeing that, for instance, in Germany the disease diminishes appreciably after very widespread outbreaks, I can only conclude that this is largely due to the fact that the cattle have in many cases acquired immunity for a more or less protracted period. I do not think that Dr. Bugge, of Kiel, was right when he prophesied to the farmers in Holstein and Schleswig that the disease will spread still further next year (1912)—I hope that the contrary will be the case.

During the period from August, 1893, to April, 1896, we experienced in Denmark only the above-mentioned five cases on farms which had previously suffered from the disease. But subsequently, during the years 1896-1901, we had each year a few outbreaks, all of which were stopped very quickly by killing all the ruminants and swine on the farm. In some cases the disease spread to a limited number of other herds in the same neighborhood, chiefly through the dairies, but in other cases it was limited to the farm which it had first attacked. In 1896 we had three outbreaks, *i.e.*, on April 7th at Bonderup, near Korsør; on October 14th on a farm at Nebbelund, near Rødby; and on December 14th at Havsgaard (Langeland). At the first-mentioned place 190 head of cattle, 13 sheep, and 152 pigs were killed. Here the disease spread during the following weeks to six other herds, partly through the milk, partly by means of rats which migrated to a neighboring property from a cowhouse which had been disinfected after killing, and partly through the slaughtermen engaged at Bonderup.

This circumstance—in conjunction with the fact that animals killed in the country under such conditions fetch relatively little—induced me in all recent cases to adopt the radical measure of burying the slaughtered animals (excepting the few which could be used on the farm) in a large pit, to which they were led and where they were shot. In this way the casualties within a herd can be ended quickly, and in many cases before the disease has had time to attack many animals. It is obvious that the danger of infection is thus reduced as far as possible. It is, for instance, a means of dispensing with the services of slaughtermen, who are very dangerous carriers of infection. It is a little more expensive, but if one has at any rate to spend thousands of kroner in stamping out the disease, I think it best to take radical measures at once. The result has in all cases justified this view. From the second

outbreak at Rødby the disease spread partly through the milk and partly through the neighbors to seven herds, which were at once destroyed.

In 1897 also we had three outbreaks, viz., on January 24th and October 24th, on two farms at Nysted and at Saksköbing, and on February 12th on a farm at Odense (Bellinge). From here it spread to three other estates, partly as a result of their proximity and partly through personal contact.

In 1898 the disease broke out on November 13th on the farm of Nottrupsgaard in the southern part of the Commune of Bjerre.

On March 25th, 1899, a large peasant farm west of Rødby was attacked by the disease.

In 1900 we again had three outbreaks, viz., on January 3rd on a farm at Radstad, near Saksköbing; on January 27th at Odegaard, barely $4\frac{1}{2}$ miles away; and on January 7th on a farm at Nyborg. The connection between Radstad and Odegaard is not clear; it is thought that perhaps game may have carried the infection. From Odegaard it spread to five other farms at Vignæs, all of which had had milk returned to them from a dairy which had been supplied with Odegaard milk. Unfortunately, the dairyman omitted to carry out the pasteurization properly, and this, without a doubt, was the cause of the infection. Finally, two months later the herd on a farm near Odegaard contracted the disease. Possibly the sending out of manure may have been the cause in this case.

On January 20th, 1901, the disease reached a farm in the neighborhood of Nysted.

After that we had a period of immunity until the 1st February, 1904, when the disease suddenly broke out in the island of Sjaelland, on a farm at Frøsley, in the southern part of Stevns. This herd was killed, but when the disease nine days later made its entry on the neighboring farm, the then Minister of Agriculture would not continue the killing. Although much was done to prevent the disease from spreading, and, for instance, one, and later on, two veterinary surgeons were dispatched to Storehedinge in order, as far as possible, to save the local men from having anything to do with the disease, it spread during the following months to 20 other herds, of which only one lay outside Stevns. In seven cases personal contact could be proved to have preceded the outbreak of the disease, and in three other cases this was probably also the cause. In one case infection was put down to mating with an infected bull. In several cases the infection was probably transmitted by the carting out of manure from infected herds. To the last place the infection was probably carried by rooks, which had a colony close by. In addition to the herd first mentioned, killing was subsequently resorted to in one single small herd at Stevns, and also in the case of the small herd outside Stevns, which was the last to be attacked. This last outbreak occurred on June 13th.

Subsequently, Denmark remained free from the disease for six and a half years, until November 24th, 1910. On that day it was discovered on a holding at Valby Mark, near Slagelse. The herd was at once destroyed, and since then the disease has not been known in Sjaelland.

On December 12th, however, it broke out on a large farm just outside Kolding, and on December 13th on a peasant farm at Lillering, west of Aarhus. The herds on both farms were destroyed at once, but on December 26th the herd of a tenant at Skovby, close to Lillering, became infected. After the slaughter of this herd no further outbreak occurred until the middle of March, 1911, when the disease appeared on the farm of one of the neighbors of the above-mentioned tenant. When the manure was carried out into the fields to be ploughed in it was noticed that numerous rooks settled on it, and thereupon flew away to a neighbor's turnip-pit which had just been opened for fetching home turnips. A few days later this man's cows became infected, and the disease now spread to five herds in all, in two cases doubtless through personal contact. All herds were killed as quickly as possible, and all manure from these farms was buried.

At the end of April and the beginning of May the disease attacked two small adjoining farms in North Falster, and in July it appeared on a peasant farm in Langeland, close to the east coast of the island. These herds were also destroyed.

WAYS IN WHICH THE DISEASE IS TRANSMITTED.

As previously stated, it has not been possible in any one of the fairly numerous outbreaks of foot-and-mouth disease which we have had to deal with since October, 1892, to prove in what way the infection was conveyed to the herd which first became infected. It is a striking fact, however, that the disease has, with very few exceptions, been restricted to estates in the southern part of the country—chiefly Lolland, Langeland, South Sjaelland, Fyen, Southern Jutland (Kolding and the neighborhood near the Vejle Fjord); and that once only, in 1892, it attacked Holstebro, and once, in 1910, the neighborhood west of Aarhus. An estate close to the coast has had more frequent recurrences of the disease than any. This fact is difficult to understand on the assumption that the infection is conveyed by fodder from foreign countries, which is distributed throughout Denmark; but, on the other hand, it points distinctly to the infection being carried hither from Germany, where the disease has existed continuously. It must be a natural mode of transport, but which? I have thought for many years that it might be birds, such as gulls, crows, rooks, &c., which might conceivably fly across from Germany and carry infection on their feet, or possibly in their intestines, after having collected it from infected manure. I also do not think it impossible that the infection may have been carried by the wind. It might be a question of particles floating in the air in a free condition, or attached to the legs of insects, or possibly spiders' webs, called

in Danish the "flying summer," which just at this time of the year are seen flying about in profusion.

The virus itself is not known, but it has been proved to exist in the matter contained in the vesicles, and to be liberated when these burst. Thus it comes out in the saliva, the manure (after passing through the intestines), and the matter discharged from the vesicles on hoofs and udders. It is known that the virus is a very minute object—doubtless a microbe—and that it passes through the pores of a filter, that is to say, it is smaller than the smallest of the bacteria visible under a microscope. It is likewise known that very little is needed to infect an animal with the disease, inoculation with one-five-thousand of a c.c. of the contents of a vesicle being sufficient. Such small objects do not require large means of transport.

I have not had time to examine very closely the direction of the winds prevailing at the various points where the disease has appeared, but a cursory inspection of the printed records of a meteorological institution shows that southerly and sometimes south-westerly and south-easterly winds have been blowing before each outbreak.

The remarkable fact that the disease may break out in an otherwise healthy country without any apparent cause has been observed several times in England, which is no more inclined than Denmark to receive animals with foot-and-mouth disease from infected countries. The theory of the wind as an infection-carrier is an old one, and in Holland observations have recently been made which seem to support it.

In Sweden observations were once made which seem to indicate that the infection can remain for a long time with an animal which has passed through the disease. A Dutch bull was once, after undergoing the prescribed period of quarantine, imported into a herd in the far north of Sweden, and several months later this herd was visited by the disease. It was then found that the Dutch bull had a deep slit at the back of the hoof—such as is often formed during the disease when the horn comes off—and that this slit, just at the time that the disease broke out in the herd, had grown so far down as to release, presumably, the virus hidden in it. But there can be no question of any such infection in Denmark, as in no case have cattle been imported from abroad.

Whatever may be the connection between the various cases here and foreign importation, it is plain that at the present time we are very liable to receive infection from Germany. It is difficult enough to avoid its introduction through persons who have visited German cattle markets or who have come into touch with infected herds in Germany, but we are quite at a loss to cope with infection carried by birds or by the wind. The frequent occurrence of the disease at the time of year when turnip leaves are used as fodder might indicate that the latter are especially liable to carry the disease. This could not be the case if the turnip leaves were used in the form of silage

fodder. Although, for the reasons above stated, I do not believe much in the carriage of infection through foreign fodder or packing, it cannot, of course, be denied that there is something in the suspicion. The same applies to railway wagons used for cattle transport in Germany.

During the past month (September, 1911) the disease has assumed somewhat disquieting proportions in our country. On September 23rd it appeared on a large farm, Nordenbrogaard, in the southern part of Langeland. Although the cattle were killed, not only there but also on three smaller estates in the neighborhood, the disease nevertheless spread to two other large farms in the vicinity, namely Brolykke and Tryggelevgaard, and to four small farms near the latter. In Lolland it made its appearance in a very large herd at Fredsholm, near Nakskov, and later it broke out at Halstedgaard, Arevlund, and Rudbjerggaard in the same neighborhood, and at a small holding at Vaabensted, near Saksköbing, and another small holding at Langö, close by the Nakskovfjord. These two small herds were killed, but naturally it was not thought right to expend the large sums that would have been required to destroy the large herds.

In Fyen the disease appeared on October 6th on a peasant farm at Vantinge, west of Ringe, and the next day at Hvedholm, near Faaborg, and on a peasant farm at Drejø. These herds were allowed to live, and the disease has since appeared in nine other small herds in the part south of Odense, at Fraugde and neighboring parishes. In some cases the mode of infection has been easy to trace, animals having been moved from one infected herd, where the disease was not discovered in time, to other herds. In other cases it was clearly due to human agency, or it may have passed on to neighboring properties, but in some instances the connection has not been explained. In a densely-populated district with close intercourse there are, however, plenty of opportunities for the infection to be carried, even if the means are not always clear. Birds and the wind may, of course, play an important part. In Fyen the method of slaughter has hitherto only been applied in three small herds.

Jutland has not been free either, and on October 3rd the disease was discovered on a small peasant farm at Scaksrode, close to Vejle Fjord (Commune of Bjerre). The herd was slaughtered immediately, and up to the present there have been no recurrences there.*

All this looks very disquieting, and some uneasiness is naturally felt as to how things will go this winter and next year. Are we possibly face to face with a great visitation of the dreaded disease, which may invade the whole country and cause incalculable loss by depreciating the value of our herds and giving rise to unavoidable interference with our trade? One might

* Since this paper was read there has unfortunately been a case in Sjaelland, on October 23rd, on a small holding at Flakkeberg Mark, near Dalmose. This herd is being slaughtered.

almost be inclined to believe it. There are enough grounds for anxiety, and it is necessary for every stockowner to be on his guard, so as to avoid all possible contact with infected herds, either directly or indirectly; but it seems to me that the summary which I have given of the history of the disease in this country may serve to allay our fears to some extent. It is true that we have had many outbreaks, but we have succeeded in checking them quickly by killing sundry herds or groups of herds infected by those which were first attacked; and even in 1892 and 1893, as well as in 1904, when we did not resort to killing, we succeeded by effective isolation in keeping the disease within reasonable bounds, with the result that the situation here has been much better than in Germany and many other countries.

To succeed we require, however, in the first and foremost place, great vigilance, so that cases of disease may be notified to the veterinary surgeons without any delay, and necessary steps be taken to isolate the infected herds as effectively as possible. These precautionary measures of isolation must be carried out with forethought and thoroughness. It must be borne in mind that the virus in the case of this disease is extraordinarily liable to be transmitted, much more so than in the case of any other disease. It adheres to clothing and articles, and may, for instance, without a doubt be conveyed to a herd of animals through a person who has not himself been in an infected building, but who has merely been in close contact with someone who has been there. The intimate social intercourse prevailing in this country undoubtedly means an increased risk of infection, and such intercourse should, therefore, in times such as these be greatly restricted.

Fortunately the disease has not so far been of a malignant character. Doubtless a number of young calves and pigs have died, and also occasionally older pigs, but hitherto there have been no casualties among adult animals, and the loss of milk seems hitherto in most places to have been moderate. This may, however, easily change, and I fear that it will probably be found in time that owners of herds which are visited by the epidemic may sustain appreciable losses.

The treatment of diseased animals consists first and foremost in very thorough care. Suitable soft and clean fodder and ready access to water are the most important requirements as regards the mouth complaint, and dry and clean litter, with ample straw, is of the utmost importance when dealing with the teat and hoof complaints. Proper cleaning of the stalls and good ventilation are also very important. There is no specifically acting remedy as far as we know, and in its usual mild form no medicinal treatment is needed for the mouth disease. The affected teats and hoofs may, however, occasionally benefit by expert veterinary treatment.

RECENT HISTORY OF THE DISEASE IN DENMARK.

According to a desire expressed by Sir Thomas Elliott, I add to the above paper a short description of the history of foot-and-mouth disease in Denmark during the period from October, 1911, to July, 1912.

In the Isle of Langeland, where the disease began on the 23rd September, it spread to 50 herds altogether, chiefly in the southern half of the isle. The last case occurred on February 27th, 1912.

In Fyen, during the period from October 6th, 1911, till April 3rd, 1912, 352 herds were attacked. At first the disease occurred especially in the centre of the island, with a few scattered cases in the southern and western parts; but later on it extended very widely in the northern part, where from December to February more than 100 herds were attacked. After April 3rd only three cases occurred in Fyen, all in June. In two of these cases the disease appeared in newly bought cattle on farms where it had existed in January; the third case originated from contagion from one of those farms. Since that time the island has been free from the disease.

In a small island, Drejo, south of Fyen, only the one case already mentioned occurred. In the somewhat larger island, Aero, 32 cases occurred between November 1st and the end of February.

In Lolland, as mentioned, the disease began on September 29th among a large herd (358 head of cattle), and in the course of the following months it spread greatly in the western part of the island, and later also in the southern part. On the whole, 121 herds were attacked. After the end of March only very few herds were attacked in this island, the last one on April 17th.

In Falster 52 herds were attacked between October 24th and May 12th.

In the Isle of Moen, east of Falster, only one herd has been attacked—in the middle of April; and in Bornholm also only one case appeared—on the 3rd of December. The animals in this herd were immediately killed.

In Sjaelland the disease was very widespread (577 herds). It appeared here on 24th and 28th October on two small farms near each other in the south-western part of the island. Both herds were immediately killed, but on the 1st, 2nd, and 4th November it appeared in five herds, of which three were very large: three of these were in the south-west part of the island, two were far off in the north and east. The disease subsequently spread over a large part of the island; the cases partly were scattered, but mostly occurred in larger or smaller groups; the disease was most widespread on the Steons Peninsula on the east side of Sjaelland, where 90 herds were attacked in February-March. The last outbreak in Sjaelland and also in Denmark occurred on July 29th.

In Jutland the disease, as mentioned in the above paper, broke out on the 3rd October on a small farm north of Vejle Fjords in the south-eastern part of the country. In the beginning of November it appeared on a farm in the neighborhood of the first one, and on a large farm south of Kolding

near the Schleswig frontier. In each of these places the herd was killed, but on the 14th November the disease broke out on a large farm east of Horsens, and in the following months it spread to several farms, especially in the neighborhood of Horsens, Vejle, and Fredericia, together with some scattered cases a little more to the south and west. It did not, however, extend far up in Jutland, and only 92 herds were attacked; the last outbreak but one was on the 3rd April, and the very last in this part of the country took place on the 27th June.

During this epidemic in all Denmark, on the whole, 1,285 herds were attacked, consisting of 48,330 head of cattle, 2,801 sheep, 80 goats, and 34,871 swine. Swine were diseased on half the farms only, and in many cases sheep were also exempt. As Denmark has about 2,250,000 head of cattle, it appears that only about 2 per cent. of the cattle have been diseased.

In the beginning of the epidemic we attempted to stop the disease by killing as fast as possible all ruminants and swine on the diseased farms, but as at the end of September and the beginning of October the disease attacked several very large herds, this procedure had to be given up. Later on, however, a few herds were killed, when the disease broke out in parts of the country hitherto free. Altogether slaughtering was carried out in the case of 32 herds, comprising 388 cattle, 21 sheep, and 314 swine, and the cost amounted to about 100,000 Danish crowns (£5,500).

Moreover, the disease was combated by thorough isolation of the infected farms, and by prohibiting the removal of live animals, as well as of untreated milk, hay, and straw, regulations as to tying up dogs, isolation of poultry, &c. In smaller or larger areas round the affected herds the movement of ruminants and swine was also restricted, &c., and it was forbidden to transport such animals and hay and straw from the islands to Jutland, as well as to other countries. Among the other measures taken must be named the compulsory heating of all skimmed milk, butter milk, and whey in the co-operative dairies in the affected parts of the country, before these products were sent back from the dairies to the farmers, in order to prevent infection by feeding them to calves and pigs.

As I considered it very probable that fæces of diseased animals might be a means of spreading the germs, *i.e.*, through animals, especially birds, I induced the Government to pass an order on January 3rd, directing the manure made during the period of the prevalence of the disease to be buried or at least covered with a layer of earth, sufficient to prevent poultry or other birds coming into contact with it.

In some parts of the country, especially in Jutland, young veterinary surgeons were engaged to superintend the infected herds, in order not to expose the practising veterinary surgeons to the risk of carrying the germs from infected herds to other farms, and in the last months of the epidemic we were able to apply this measure in all cases.

In the above paper I called attention to the fact that in the different outbreaks of foot-and-mouth disease it had never been possible to prove in what way the infection was carried to the herd which first became infected. The same was the case in this epidemic. This time the disease began almost simultaneously in several places in the southern part of the country, though there was not the slightest communication between the farms. On the 29th September it came to Fredsholm by Nakskov (Lolland), and on October 3rd it appeared simultaneously at Saxkøbing (Lolland) and in Staksrøde (southern Jutland), and on October 7th at the same time in five places in Fyen. Considering that just at that time the disease reached its greatest frequency in northern Germany (there were in Schleswig-Holstein on August 31st, September 15th, and September 30th, 7,808, 7,576, and 6,341 infected herds respectively, and in Mecklenburg on these dates, 644, 443, and 702 infected herds), there can be no doubt that in some way or other contagion must have been brought to Denmark from these countries. And, considering that in the last week of September and October 3rd and 4th chiefly south-westerly and southerly winds prevailed over the southern part of Denmark, it seems very probable that the germs were carried with the wind from infected farms in Germany to the Danish islands.

After the importation of the disease into Denmark, it was in several cases easily seen how it was spread by the cattle trade, or by moving cattle into shelter, and there were reasons for supposing that dogs, cats, rats, or birds had spread the contagion, or that it had been transmitted through infected milk, or milk churns, or railway trucks. But many cases remained in which it was impossible to find the way in which the disease had spread, and in some cases it was probable that the wind had played a part.

The disease varied greatly in character. In many cases it was mild and did not cause great losses; in many cases it was rather malignant.

With regard to mortality, we have exact information only for a little more than half the herds. In these, 3·4 per cent. of cattle died. Of these far the larger number were calves (84·6 per cent.), and among adult cattle the mortality was only 0·5 per cent. Out of 305 herds of swine, comprising 9,227 animals, 1,403, or 14·4 per cent., died; 78·3 per cent. of these were sucking pigs, 20·6 per cent. young pigs, and 1 per cent. older pigs.

The loss of milk was in many cases considerable, not only during the period in which the disease was prevalent, but long afterwards, and there were among the cattle many cases of malignant udder inflammation, of abortion and temporary sterility. Thus also in this country foot-and-mouth disease has proved a plague, the combating of which is well worth great sacrifices.

THE WHEAT MARKET.

There was but little doing in the English wheat market during December. The general tendency was for a decline in prices, but pending the result of the crop in the Argentine being assured there was little disposition to trade. Locally the market was somewhat irregular, as, while the average price for farmers' lots the greater part of the month was 3s. 6d., two or three houses were offering 3s. 7d. for prompt delivery, and others on one occasion reduced their figure to 3s. 5d. per bushel.

✶ Writing under date, London, December 6th, *Beerbohm's Evening Corn Trade List* states—"The Plate crop is expected to be a large one if favored with fine weather for the next few weeks, but it is still too early to make any reliable estimate. Much damage was done last year in December and January by heavy rains. The weather reports of the next few weeks will be anxiously watched by the Trade.

"Shipments last week were much smaller than in the previous week, but more than equal to requirements; the proportion to the U.K., however, was only moderate. Imports were liberal, and well above the weekly consumption. Stocks in the ports increased somewhat during November, and are now about the same as last year, but invisible reserves are believed to be liberal. At Antwerp, although the imports have been only moderate during the past few weeks, the stock has increased from 140,000 quarters to 300,000 quarters since the beginning of November, so that millers evidently held fair reserves a month ago; at the present time they are reported to be small.

"Receipts of wheat at Western points in America fell off appreciably last week, but were more than double those of the corresponding week in the three previous years, and are still very large for the time of year.

"It will be seen by the tabular statement given below that the world's visible supply has increased during November by 3,635,000 quarters, the very large augmentation in North American figures being the cause of the increase. Last year there was an increase of 2,545,000 quarters and in 1910 of 1,455,000 quarters.

THE WORLD'S VISIBLE WHEAT SUPPLY ON DECEMBER 1st.

	European.	U.S./Canada.	Total.	Eng. Aver'go
	Qrs.	Qrs.	Qrs.	Price.
1912	9,585,000	13,880,000	23,465,000	31/9
1911	10,005,000	13,900,000	23,905,000	32/10
1910	13,295,000	9,850,000	23,145,000	30/6
1909	8,285,000	7,500,000	15,785,000	33/
1908	7,400,000	10,500,000	17,900,000	32/3
1907	7,730,000	8,250,000	15,980,000	34/7
1906	9,345,000	9,850,000	19,195,000	26/1
1905	8,870,000	8,550,000	17,420,000	28/8
1904	10,445,000	8,015,000	18,460,000	30/5
1903	8,620,000	7,825,000	16,445,000	26/6
1902	8,630,000	10,330,000	18,960,000	25/-
1901	9,005,000	11,625,000	20,630,000	27/1
1900	8,680,000	12,080,000	20,760,000	27/-
1899	8,230,000	11,950,000	20,180,000	25/8
1898	7,000,000	6,500,000	13,500,000	27/7
1897	8,310,000	7,100,000	15,410,000	33/8
1896	9,033,000	10,250,000	19,283,000	33/4

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Dec. 7	Steady, but quiet	3/6 to 3/7	3/8½	3/7
9	—	Do.	Do.	Do.
10	Dull, with easier tendency	Do.	Do.	Do.
11	Dull	Do.	3/7	3/6½
12	Steadier, but not active ; Liverpool steadily held, not active ..	Do.	Do.	Do.
13	Do.	Do.	Do.	Do.
14	Firmer, improved demand ; Liverpool steady, quiet ..	Do.	Do.	Do.
16	—	Do.	Do.	Do.
17	Dull easier tendency ; Liverpool steady but quiet ..	Do.	Do.	Do.
18	Steady ; Liverpool quiet	3/6	3/6	3/6
19	Firm, rather dearer, Dec.-Jan., 4/8 ; Jan.-Feb., 4/8½ ; Liverpool steady, Dec.-Jan., 4/7½	Do.	Do.	Do.
20	Quiet ; Liverpool firm, Dec.-Jan., 4/9	Do.	Do.	Do.
21	Quiet	Do.	Do.	Do.
23	—	Do.	Do.	Do.
24	Dull and lower ; Liverpool dull	—	—	—
25	—	3/6	3/6 to 3/6½	3/6 to 3/6½
26	—	Do.	Do.	Do.
27	—	Do.	Do.	Do.
28	Firm, but quiet ; Liverpool steady	Do.	Do.	Do.
30	—	Do.	Do.	Do.
31	Quiet ; Liverpool firm, quiet	Do.	Do.	Do.
Jan. 1	—	—	—	—
2	Steady, but quiet	3/6	3/6 to 3/6½	3/6 to 3/6½
3	Do.	3/6 to 36/¼	Do.	Do.
4	Firm, but quiet ; Liverpool steady, quiet	3/6 to 3/7	Do.	Do.

STEAMER FREIGHTS.—(December 4th).—Steamers from South Australia to United Kingdom-Continent, full cargo rates, new crop, 43s. per ton (1s. 1½d. per bushel) ; to South Africa, 33s. 9d. per ton (10½d. per bushel). Parcels, Port Adelaide to London, Liverpool, or Continent, 36s. 3d. per ton (11½d. per bushel) ; Port Adelaide to Melbourne, 8s. per ton (2½d. per bushel) ; to Sydney, 10s. 6d. per ton (3½d. per bushel).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent (Dec.-Jan.), 37s. 6d. (nominal) per ton (11½d. per bushel) ; to South Africa, new season, 30s. per ton (9½d. per bushel).

RAINFALL TABLE.

The following table shows the rainfall for December, 1912, at the undermentioned stations, also the average annual rainfall and the total for the years 1912 and 1911 respectively:—

Station.	For Dec., 1912.	Av'ge. Annual.	Year 1912.	Year 1911.	Station.	For Dec., 1912.	Av'ge. Annual.	Year 1912.	Year 1911.
Adelaide.....	1.60	20.55	19.53	15.99	Hamley Bridge	0.81	16.48	14.23	13.10
Hawker.....	0.65	12.13	12.41	11.23	Kapunda.....	0.96	19.71	17.69	14.79
Craddock.....	0.45	10.69	11.75	9.48	Freeling.....	0.97	17.85	16.78	13.49
Wilson.....	0.35	11.68	11.72	8.75	Stockwell.....	1.04	20.29	20.36	16.23
Gordon.....	0.30	9.91	10.97	9.75	Nuriootpa....	1.01	21.37	19.54	14.33
Quorn.....	0.47	13.75	15.49	7.97	Angaston ...	1.45	21.96	24.31	20.68
Port Augusta	0.44	9.62	11.11	7.09	Tanunda	1.69	21.95	29.35	21.25
Port Germein	0.84	12.62	12.30	12.01	Lyndoch	1.45	23.05	22.08	18.75
Port Pirie....	1.31	12.86	12.90	12.75	Mallala.....	0.71	16.86	14.26	14.64
Crystal Brook	0.73	15.42	14.89	14.40	Roseworthy..	0.88	17.39	14.26	12.51
Pt. Broughton	0.27	14.19	12.54	13.83	Gawler.....	1.26	19.26	18.35	13.20
Bute.....	0.45	15.22	12.55	14.89	Smithfield....	1.35	17.24	15.52	12.49
Hammond ..	0.24	11.22	11.48	9.32	Two Wells....	0.88	16.51	12.51	11.91
Bruce.....	0.32	9.50	12.09	7.33	Virginia.....	1.09	17.57	15.19	13.12
Wilmingtong..	0.60	18.06	19.40	15.46	Salisbury....	1.88	18.45	18.95	16.06
Melrose.....	0.62	23.03	20.29	17.26	Teatree Gully	2.27	28.64	16.93	19.00
Booleroo Cntr.	0.63	15.94	13.13	10.33	Magill.....	2.25	25.94	23.21	16.17
Wirrabara....	0.90	18.74	19.85	14.02	Mitcham	1.40	23.80	19.43	17.80
Appila.....	0.46	14.87	17.75	13.41	Crafers.....	4.05	46.65	44.04	41.21
Laura.....	1.34	18.02	16.36	15.12	Clarendon ...	2.99	33.86	27.79	28.58
Caltowie.....	0.98	17.19	15.29	15.24	Morphett Vale	1.57	23.50	18.50	20.26
Jamestown ..	1.17	17.21	19.70	17.05	Noarlunga....	1.15	20.23	17.83	19.56
Gladstone ...	1.16	15.84	14.84	14.84	Willunga.....	1.39	25.86	21.83	26.27
Georgetown...	0.83	18.10	18.22	16.87	Aldinga.....	1.03	20.33	15.83	18.49
Narridy.....	0.18	16.83	14.07	15.20	Normanville..	1.27	20.57	16.28	18.12
Redhill.....	0.30	16.62	13.81	10.12	Yankalilla...	1.56	21.95	19.99	23.87
Koolunga....	0.33	15.73	14.37	13.34	Eudunda....	1.19	17.06	16.59	15.39
Carrieton....	0.18	12.03	11.62	10.97	Sutherlands ..	0.30	10.26	9.71	10.34
Eurelia.....	0.39	13.14	12.90	10.13	Truro.....	1.17	19.49	23.54	16.85
Johnsburg....	0.28	9.96	11.08	9.74	Palmer.....	0.60	15.26	16.05	10.98
Orroroo.....	0.30	13.41	12.13	8.55	Mt. Pleasant.	1.07	26.88	24.60	21.00
Black Rock..	0.22	12.13	11.72	9.38	Blumberg....	1.21	29.65	26.33	21.91
Petersburg...	0.69	12.96	14.25	11.17	Gumeracha....	2.97	33.36	32.29	25.37
Yongala.....	0.73	13.83	13.58	12.29	Lobethal....	2.33	35.74	31.83	26.88
Terowie.....	0.63	13.56	13.09	11.31	Woodside....	1.83	31.74	33.14	27.38
Yarcowie....	1.33	13.66	14.21	13.34	Hahndorf....	1.94	35.61	27.23	30.85
Hallett.....	0.85	16.35	14.92	14.28	Nairne.....	1.32	28.89	23.78	26.15
Mount Bryan	0.84	15.59	15.45	13.04	Mt. Barker...	1.88	30.96	27.37	28.70
Burra.....	0.92	17.72	17.60	16.36	Echunga....	2.21	32.77	28.11	30.86
Snowtown....	0.64	15.72	13.05	11.87	Macclosfield..	1.72	30.68	31.61	27.24
Brinkworth...	0.54	15.08	14.66	14.56	Meadows.....	2.01	35.47	31.45	32.85
Blyth.....	0.46	16.28	13.71	15.77	Strathalbyn..	1.06	19.13	17.17	19.87
Clare.....	0.99	24.30	20.43	20.98	Callington....	0.59	15.82	10.57	12.48
Mintaro Cntrl.	0.56	22.16	17.14	18.86	Langhorne's B.	1.21	15.41	10.83	12.86
Watervale....	0.93	27.42	21.34	21.98	Milang.....	0.84	16.40	10.02	11.25
Auburn.....	1.24	24.30	17.41	19.37	Walleroo....	0.47	13.86	15.75	15.69
Manoora.....	0.81	18.29	13.96	14.21	Kadina.....	0.41	15.82	14.88	14.85
Hoyleton....	0.87	18.11	12.82	14.95	Moonta.....	0.49	15.22	14.42	14.00
Balaklava ...	1.02	16.00	12.58	14.49	Green's Plains	0.09	15.94	11.24	11.27
Pt. Wakefield	0.18	12.98	11.46	15.72	Maitland	1.75	20.10	18.51	18.41
Saddleworth..	0.88	19.85	15.16	14.21	Ardrossan ...	0.80	13.82	13.15	12.74
Marrabel ...	0.68	19.24	12.86	12.43	Pt. Victoria..	0.78	15.12	14.30	16.40
Riverton	0.94	20.54	16.15	16.45	Curramulka...	1.35	18.55	14.38	15.66
Tarlee.....	0.78	17.51	15.74	13.06	Minlaton	1.08	17.41	14.13	15.89
Stockport....	0.93	15.98	14.81	12.01	Stansbury....	0.78	16.92	15.44	17.01

RAINFALL TABLE—continued.

Station.	For Dec., 1912.	Av'ge. Annual.	Year 1912.	Year 1911.	Station.	For Dec., 1912.	Av'ge. Annual.	Year 1912.	Year 1911.
Warooka....	1-01	17-47	13-54	22-33	Bordertown...	1-98	19-94	17-38	15-16
Yorktown ..	1-08	17-36	14-30	17-51	Wolseley	1-83	17-80	17-19	13-69
Edithburgh...	1-22	16-39	13-85	15-73	Frances	2-02	20-55	20-65	20-11
Fowler's Bay.	0-10	12-15	10-87	12-61	Naracoorte ..	1-59	22-49	23-27	21-15
Streaky Bay..	0-05	15-17	15-89	18-10	Lucindale....	1-79	22-99	25-05	23-30
Port Elliot..	0-05	16-13	18-78	19-78	Penola.....	2-10	26-72	25-75	24-13
Port Lincoln.	0-51	19-79	19-98	18-54	Millicent.....	1-96	28-93	27-00	32-69
Cowell	0-23	11-78	11-31	10-87	Mt. Gambier.	2-62	31-76	30-04	33-75
Queenscliffe...	1-17	18-31	17-86	21-33	Wellington...	0-96	15-08	11-59	12-17
Port Elliot....	1-37	20-37	17-12	17-61	Murray Brdg.	1-09	14-32	10-90	10-56
Goolwa.....	1-22	17-74	17-72	18-92	Mannum	0-39	11-64	7-32	7-35
Meningie	1-57	18-92	15-61	15-58	Morgan.....	1-05	9-15	8-99	9-87
Kingston....	0-85	24-37	31-41	24-80	Overland Crnr.	0-70	11-27	9-70	11-72
Robe.....	1-90	24-63	21-63	23-05	Renmark....	0-89	10-80	9-67	10-62
Beachport...	1-52	27-17	23-19	29-63	Lameroo	1-35	16-36	16-98	15-63
Coonalpyn ..	1-36	17-64	16-25	14-51					

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Department reports on January 2nd:—
BUTTER FACTORY.

The supply of cream received at the factory during the month has been exceptionally large for this period of the year, and the butter, being up to its usual standard, has been in great demand. Prices have risen during the month, present quotations being superfine, 1s. 2d. per pound; pure creamery, 1s. 1d. per pound.

A. W. Sandford & Co., Limited, report on January 2nd—

BUTTER.—The weather during December was comparatively cool, except for one heat spell. Supplies of butter and cream are now decreasing. Present values are—best factory and creamery, fresh in prints, 1s. $\frac{1}{2}$ d. to 1s. 2d.; choice separators and dairies, 10 $\frac{1}{2}$ d. to 11 $\frac{1}{2}$ d.; store and collectors, 9d. to 9 $\frac{1}{2}$ d.

EGGS.—The egg market was very active, and local and inter-State buyers continued to operate. Rates are now 11d. per dozen for guaranteed new-laid hen; duck, 11 $\frac{1}{2}$ d.

CHEESE.—The volume of turnover has been extensive for local use, and also for oversea buying orders. New make, 6d. to 6 $\frac{1}{2}$ d. for large to loaf; matured, up to 11d.

BACON.—Curers have had a very busy time, the demand for bacon and hams being exceptionally heavy. Best factory cured sides, 9 $\frac{1}{2}$ d. to 10 $\frac{1}{2}$ d.; middles, 10d.; fitches, 8 $\frac{1}{2}$ d.; hams 1s. to 1s. 1d.

HONEY.—The take has not turned out as well as was expected in the early part of the season, so that buyers are anxious to secure anything of prime offering at 3 $\frac{1}{2}$ d. per pound.

ALMONDS.—Only odd lots are going through, and therefore, purchasers are waiting the arrival of the new crop. Brandis, 5 $\frac{1}{2}$ d.; mixed soft shells, 5 $\frac{1}{2}$ d.; kernels, 1s. 3 $\frac{1}{2}$ d. per pound.

LIVE POULTRY.—Sales during December have been quite up to the usual Christmas markets, in fact in some lines record prices have been realised, especially for turkeys. Good table roosters sold at 3s. 6d. to 4s. each; plump cockerels, 2s. 6d. to 3s. 3d.; hens, 2s. to 2s. 6d.; ducks, 2s. 4d. to 3s. 6d.; geese, 3s. to 4s. 6d.; pigeons, 6d.; turkeys, 10d. to 1s. per lb. live weight for fair to prime table birds.

POTATOES AND ONIONS.—In both potatoes and onions local supplies considerably increased during the month, with a result that rates have at least fallen back to what may be termed a reasonable level. The early Victorians and Gambiers are now available, and the crops in both these parts are expected to be heavy, so that it is anticipated that these lower prices will still prevail. Present quotations—Potatoes, new locals, £6 to £7 per ton, on trucks Adelaide or Port; onions, £6 per ton, on trucks Adelaide or Port,

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Jan.	Feb.			Jan.	Feb.
Amyton	714	—	—	Hookina	714	21	18
Angaston	*	18	15	Hooper	721	—	—
Appila-Yarrowie	*	—	—	Ironbank	728	17	21
Arden Vale & Wyacca	*	—	—	Julia	*	—	—
Arthurton	*	—	—	Kadina	*	21	18
Balaklava	*	—	—	Kalangadoo	730	11	8
Beetaloo Valley	*	—	—	Kanmantoo	*	18	15
Belalie North	*	18	15	Keith	*	18	15
Berri	720	18	15	Kingscote	*	7	4
Blackwood	†	—	—	Kingston	*	25	22
Blyth	716	18	15	Koppio	718	—	—
Bowhill	*	—	—	Kybybolite	†	18	15
Bowmans	*	—	—	Lameroo	*	—	—
Burra	*	—	—	Leighton	*	—	—
Bute	*	—	—	Lipson	*	—	—
Butler	*	—	—	Longwood	†	22	19
Caltowie	*	—	—	Lucindale	*	25	22
Carrieton	*	—	20	Lyndoch	*	16	—
Cherry Gardens	727	21	18	MacGillivray	*	—	—
Clanfield	*	—	—	Maitland	*	2	6
Clare	*	17	21	Mallala	*	6	3
Clarendon	*	20	17	Mangalo	719	—	—
Colton	716	—	15	Mannum	*	25	22
Coomooroo	*	—	—	Meadows	*	—	—
Coonalpyn	721	—	—	Meningie	†	18	15
Coorabie	717	—	—	Millicent	731	14	11
Cradoek	*	—	—	Miltalie	*	18	15
Crystal Brook	*	—	—	Minlaton	*	23	20
Davenport	714	—	—	Mitell	*	18	15
Dawson	*	—	—	Monarto South	*	—	—
Dingabledinga	*	—	—	Monteith	722	—	—
Dowlingville	*	—	—	Moonta	*	—	—
Elbow Hill	*	—	—	Moorlands	*	—	—
Forest Range	*	23	20	Morchard	715	—	15
Forster	*	—	—	Morgan	*	—	—
Frances	*	17	21	Morphett Vale	*	—	—
Freeling	*	—	—	Mount Barker	*	23	20
Friedrichswalde	*	—	—	Mount Bryan	*	18	15
Gawler River	*	—	—	Mount Bryan East ..	*	4	1
Georgetown	*	18	15	Mount Gambier	*	—	—
Geranium	*	25	22	Mount Pleasant	728	10	14
Gladstone	*	—	—	Mount Remarkable ..	†	22	19
Glencoe	729	—	—	Mundoora	*	—	—
Goode	*	—	—	Nantawarra	*	22	19
Greenock	*	—	—	Naracoorte	732	11	8
Green Patch	*	—	17	Narridy	*	—	—
Gumeracha	*	20	17	Narrung	*	—	—
Hartley	728	22	22	North Booborowie ..	*	—	—
Hawker	*	20	17	Northfield	*	7	4

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Parilla Well	*	—	—	Sutherlands	†	—	15
Parrakie	*	4	1	Tatiara	*	4	1
Paskeville	*	23	20	Tintinara	724	25	—
Penola	*	4	1	Uraidla and Summert'n	729	6	3
Penong	*	11	8	Utera Plains	*	18	15
Petina	*	—	—	Waikerie	726	—	—
Pine Forest	*	21	18	Warcowie	*	—	—
Pinnaroo	*	—	—	Watervale	*	—	—
Port Broughton	*	17	21	Wepowie	*	—	—
Port Elliot	*	18	15	Whyte-Yarcowie....	*	—	—
Port Germein	716	—	—	Wilkawatt	*	—	—
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Quorn	*	—	—	Willunga	*	4	1
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* No report received during the month of December.

† Formal report only received.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

February 12th, March 12th.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Amyton, November 18.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O. Donoghue (chair), W. Gum, R. Brown, D. P. Aitken, T. Ward, A. J. Phillis, A. Crisp (Hon. Sec.).

HARVESTERS OR STRIPPERS.—A discussion on the relative value of the harvester and stripper was initiated by the Secretary reading a paper written by Mr. E. Fisher, of the Balaklava Branch, and printed on page 310 of the October, 1911, issue of the *Journal*. Mr. Gum expressed the view that the price of the harvesters, together with the heavy draught, as compared with strippers, distinctly pointed to the advisability of using the strippers and winnowers in this district. While it was generally agreed that it was better to use strippers in a season like the present for the purpose of saving the cocky chaff, in an ordinary season the use of the harvester was a payable proposition.

Davenport, November 28.

(Average annual rainfall, 9 in.)

PRESENT.—Messrs. Roberts (chair), Bothwell, Gosden, Sanderson, Bice, Holdsworth, and Lecky (Hon. Sec.).

A RETROSPECT.—Mr. A. Bothwell contributed an interesting paper dealing with the work accomplished by the Branch since its inception in September, 1888. Many matters of local interest were touched on, and Messrs. J. Roberts, J. Holdsworth, and J. E. Lecky were said to have rendered services in the interests of the Branch which were especially worthy of mention.

Hookina, November 26.

PRESENT.—Messrs. D. E. Madigan (chair), A. Henschke, P. Kelly, B. and P. Murphy, J. Carn, S. Stone (Hon. Sec.), and two visitors.

FARM HORSES.—The paper read at the Annual Congress by Mr. W. P. Foulis, of the Willowie Branch, on this subject, was read and discussed. Members generally thought

that by the measurements the writer indicated a heavy draught instead of a medium draught. The Chairman said that, while the medium draught was better for working in these districts, it was advisable to breed heavy stock for selling.

Morchard, October 23.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. E. J. Kitto (chair), W. Took, H. Kupke, R. Jasper, W. A. Toop, R. Kitto, E. D. Kirkland, W. A. Walters, W. Reichstein, G. Rafferty, and B. S. McCallum (Hon. Sec.).

FARM IMPLEMENTS AND APPLIANCES.—In a paper on this subject Mr. Kupke stated that whenever the necessity arose for the farmer to purchase implements or machinery it was advisable to buy the most up-to-date. The suitability to local conditions should be considered, and where imported machines were purchased, care should be taken to ascertain whether duplicate parts were easily obtainable. The plough should consist of as large an implement as could be managed with the strength available, should be of the stump-jump pattern with plate shares, and constructed of spring steel throughout. Nothing less than a five-furrow implement should be used where eight horses were available. The stump-jump harrows would be found to do better work than other styles, and the cultivator should be carefully selected to suit the conditions obtaining. The drill should be easy on the horses' necks, and should not injure the grain whilst working. The greatest difficulty experienced with the binder was that the tying arrangement did not work satisfactorily. Apparently the majority of makes were constructed for cutting and binding crops on the dry side. As a general rule, the 5ft. or 6ft. harvester used in this State was unsuitable. In California the cut of these machines was much greater, and it would be an improvement if South Australian farmers followed this lead. An up-to-date chaffing plant was essential on every farm, and from five to eight B.H.P. engines would be found most satisfactory generally. When petrol engines were purchased, the four-cycle makes should be selected, as the twin-cycle consumed considerably more fuel. The wagon should be of sufficient size to do the heavy carting, should have 4in. tyres, 3in. axles, should possess a strong top and wheels capable of carrying a good load. Whenever water-pumping was to be done, a windmill would be found the most satisfactory means. All machinery should be carefully protected from the effects of the weather. In discussing the subject the majority of members expressed opinions in favor of the use of the harvester.

Ororoo, November 27.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. M. W. Forrester (chair), W. Collins, R. Shillabeer, J. M. Cadzow, J. C. Hagger, R. C. Sharp, A. L. Brice (Hon. Sec.), and one visitor.

LUCERNE AND ENSILAGE.—The Chairman read an article written by John W. Paterson, B.Sc., Ph.D., Experimentalist, and P. R. Scott, Chemist for Agriculture, and published in the Victorian *Journal of Agriculture*, showing the changes and loss that occurred when lucerne was used as ensilage. The information was based on experiments carried out at Geelong. A bag containing 30lbs. of lucerne (as it came from the cutter) was placed in the centre of a silo, 10ft. or 12ft. of silage being placed above it; after 62 days it was taken out, it then weighed 25lbs. 9oz. : 10lbs. of lucerne was chaffed at the time the bag was placed in silo; both were sent in sealed cans for analysis. The experiments proved that the dried chaff was a more concentrated food than the green lucerne or the ensilage, as it contained less water. The analysis indicated that with ensilage the most digestible parts of the carbohydrates were lost; the most apparent loss, however, was in the proteins of the silage. Ordinary cereals contained less protein than lucerne, and therefore seemed more suitable for ensiling, as they had less to lose. Ensilage had its advantages and disadvantages, and when green food was not available its advantages outweighed everything else. For dairy cows succulent fodder was necessary to obtain best results. The disadvantages of ensilage were connected with an inevitable loss of food materials; this indicated that it was wasteful to make lucerne silage for use when green feed was available. As lucerne was particularly rich in protein (which was the valuable constituent in a fodder) it seemed better that lucerne should be cured as hay rather than ensiled. Such hay would form an admirable addition to silage made from less nitrogenous fodders, such as wheat, oats, or maize.

MIDDLE-NORTH DISTRICT.**PETERSBURG TO FARRELL'S FLAT.)****Port Germeln, November 30.**

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Blesing (chair), Deer, McDougall, Hacket, Hillam, Crittenden, Stock (Hon. Sec.).

THE EFFECT OF LIME ON SOIL.—Mr. Blesing read the paper on this subject which appeared on page 362 of the October issue of the *Journal*. A good discussion followed, especially on the portion of the paper dealing with the use of shells. The speakers were unanimous in endorsing the writer's remarks, and regretted that although the supply of shell was unlimited the difficulty of obtaining it made the process of carting a tedious and costly one.

LOWER-NORTH DISTRICT.**(ADELAIDE TO FARRELL'S FLAT.)****Blyth.**

On page 612 of the December issue this Branch was incorrectly stated to have carried a motion favoring the registration of stallions. The resolution passed was "that the Branch oppose the registration of stallions."—[Ed.]

Salisbury, December 3.

(Average annual rainfall, 18½in.)

PRESENT.—Messrs. Moss (chair), E. V. Harvey, Tate, Shepherdson, Neal, Sayers, Powell, Urlwin, Baylis, Jenkins (Hon. Sec.).

HARVEST RESULTS.—Mr. Neal stated that crops grown on early fallow during the present year had shown up to considerable advantage. He followed half his land in July and the remainder in September, and got from half to three-quarters of a ton more per acre from the early fallowed land. Mr. Shepherdson reported that he had secured an average yield of 2 tons per acre from fallow land, 2 tons per acre from self-sown crop, and 1½ tons off stubble, which had carried a 2-ton crop last year. He sowed an early variety of wheat (Gluyas) on dirty land and thereby took off most of the wild oat seed with his crop. Mr. Moss recommended the application of heavier dressings of manure for hay crops in the district. He had adopted this during the present year, and the benefit derived was very noticeable.

WESTERN DISTRICT.**Colton, November 23.**

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. H. Whitehead (chair), M. D. Kenny, P. P. Kenny, R. Hull, L. Larwood, F. Shipard, A. E. Becker, E. R. DuBois, W. J. McBeath (Hon. Sec.).

RABBIT DESTRUCTION.—In a short paper on this subject Mr. R. Hull said the administration of the Vermin Acts should be taken out of the hands of the vermin boards and councils, as little good was being done under the legislation by these bodies. Phosphorised pollard was the best method of keeping the pest in check, and he advised mixing with this different

jams, &c., for the purpose of making an attractive bait. A good method was to run carrots through a sausage machine and mix with about half a bushel of pollard, adding half a stick of phosphorus and pouring boiling water on to the mixture, when it should be well stirred. To this should be added the jam, previously mixed in water, and about one and a half pints of sugar. The baits could be distributed either by placing in the burrows or with the aid of a poison cart, according to the acreage to be treated.

Coorable, November 23.

PRESENT.—Messrs. Giles (chair), Wheadon, Riddle, Atkins, Murray, Roberts, Underwood, Basnett, Iles, Coppins, Shields, Jackson, Attick, Gregory, Grivell, Cousins, Woodforde, Hobbs (Hon. Sec.), and six visitors.

ENGINE POWER ON THE FARM.—Mr. C. Iles read a paper as follows:—"Without doubt the small farm engine of the present day is one of the most useful machines a farmer can invest in. It saves him a great deal of time and hard work, and has quite replaced the old-fashioned system of horse works and hand machinery. It can be taken into the paddocks and will drive the winnower for cleaning wheat. It can be taken to the wood heap, and with a circular saw used to cut up firewood. It will drive the chaffcutter, cornmill, and in fact any machinery on the farm, and the work is done much quicker than by any other method. It also enables a man to work his farm with less assistance, and this deserves consideration where labor is scarce and wages high. There are many kinds of engines suitable for farm work, including steam, gas, oil, petrol, &c., but the best for this district are oil and petrol. There are two types of both these engines—portable and stationary. Where it can be conveniently fixed the stationary engine is the best, because it does not get so much rough usage through being carted about, and when fixed on a firm bed the vibration is very much reduced. The portable engine will be found the more convenient here, because of the winnowing, which generally constitutes an important part of the year's work. I consider the most suitable size is five or six horsepower. This engine is fairly light to cart about, and is quite strong enough to drive any ordinary farm machinery and still have a little reserve power. This reserve power is a point that should be borne in mind when purchasing an engine. It is always better to have a little too much power than not enough. I have often heard this question asked—'What is the best engine on the market?' This question cannot be answered, because it is impossible to say any particular engine is the best. Engines have reached such a high stage of efficiency that there is very little to choose between the products of many of the leading manufacturers. There are, of course, minor differences in the various makes, and if a man has an engine that has given satisfaction he swears by it as being the best make on the market, whether he knows anything about other engines or not. One cannot go far wrong in purchasing an engine of any of the leading makes now on the market. In my opinion the oil engine is preferable to the petrol engine. The initial cost of the former is greater, but it is better value for the money; for almost invariably the engine is built on a stronger principle, there is better material in it, and better workmanship. The oil engine has an advantage in fuel consumption. Benzine used by the petrol engine costs about 1s. 5½d. per gallon, while kerosine used by the oil engine costs about 10½d. per gallon, and to do the same work the petrol engine requires nearly as much benzine as the oil engine kerosine. It is not so much the quantity of benzine the engine uses, but that which is wasted through evaporation; moreover, benzine is a much more dangerous fuel to handle. Another advantage of the oil engine is the ignition. The gases in the oil engine are exploded by being admitted into a hot chamber, which is heated with a blow lamp before the engine is started, but when running is kept hot by the explosions. With the petrol engine the gases are exploded by an electric spark. To a man who does not understand electricity this ignition is very puzzling when anything goes wrong, and often a very trifling trouble will mean days delay in a busy time. Then again the speed of the two engines deserves consideration. The average speed of an oil engine of the above-mentioned sizes is 300 revolutions per minute, and a petrol engine from 400 to 500; so that to do the same amount of work a petrol engine has to make a great many more revolutions in the course of a day than the oil engine, thus there is more wear on the working parts. I have heard people say, when arguing in favor of the petrol engine, that it has an advantage over the oil engine in that it can be started at a moment's notice, and that considerable time is lost waiting for the oil engine to get hot enough to start. As a rule this is not so in actual practice. If you commence operations by lighting the lamp under the vaporiser and then attend to the oiling of the engine and machinery, adjust the belts, &c., by that time you will find the engine quite ready to start, as there are very few engines of the sizes

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Berri, November 26.

(Average annual rainfall, 10in.)

PRESENT.—Messrs. S. Phillips (chair), H. Wescombe, W. Powell, A. Arndt, M. Mahoney, J. McGilton, J. Arndt, H. R. Antuar (Hon. Sec.), and one visitor.

PRUNING OF VINES.—A demonstration of vine and fruit tree topping, which was greatly appreciated by members, was given by Mr. H. Wescombe on Mr. W. Powell's property.

TOPPING APRICOT TREES.—Mr. H. Wescombe read the following paper on this subject :—
 "This is usually described as summer pruning, but there is a great difference between summer topping and pruning. Pruning is usually carried out during the winter months, at a time of the year when the tree is dormant, then, if necessary, the trees should be cut back considerably and the main branches sawn off without, however, causing injury to them. The effect of this will be seen in the vigorous growth produced during the summer. I have observed during the last year or two several apricot orchards where the trees have been cut back to two-year-old wood, this being done during the month of January, and being termed, and rightly so, summer pruning. In one case I inquired from the owner of the property the reason for cutting back the trees as he had done, and he informed me he believed in summer topping; his reason for cutting the trees back and thinning them out being that the wood was much more simple to cut than during the winter. It is, of course, obvious that this is the case when the sap is up, but I would much prefer the use of sharp tools and carry out the work in the proper season, as severe cutting during the period of growth can be of no material benefit to the tree, but rather has a tendency to cause injury to it. Like vine topping, topping trees calls for the exercise of a certain amount of discretion. Only such trees as are making too vigorous growth can derive any benefit from this treatment. The object is to check the growth of the stronger shoots, thereby allowing of the development of the fruit spurs and buds. The tree should, however, be strong enough to recover from the effects of the check it has received. Young trees should be topped during the months of November and December, as the growth is then very rapid, so much so that a number of buds on the lower parts of the tree fail to shoot unless forced, and in all likelihood remain dormant as the tree extends. On older trees it is not convenient to top while the tree is bearing fruit, but this should be carried out immediately the fruit has been gathered. I consider that during the first five years topping is most important, while the tree is being formed. After that period, when the branches are well extended, the tree has not nearly so vigorous a growth, and although I believe it to be a good plan to top each year immediately after the fruit has been harvested, it is not so important as during the first five years. Should the old trees receive a severe pruning during the winter they should be carefully topped the following summer."

VINE-TOPPING.—Mr. H. Wescombe also read the following paper on this subject :—
 "The object of topping vines is to secure a more uniform distribution of their growth, and by this means to assist them in setting their fruit. This is done by checking the flow of sap as it rises, and topping should not be carried out indiscriminately. In this, however, the vigneron must use his own judgment. In the first place he should know the reason why the vine is being topped, and if it is really essential to top at all. It is a mistake to assume that because it is the general custom you should top also. The treatment of different blocks varies very considerably, and it is unwise to adopt any hard and fast rules. On certain land the vine has a tendency to make very rapid growth, while on other land its growth is not nearly so vigorous. The former vine, while making an enormous amount of wood growth, fails to bear fruit in proportion; while in the latter case, although the wood growth is less, the fruit capacity is greater. This is ostensibly caused by the nature of the soil, and may be due to the presence of nitrogen in abundance, which produces growth, while on the other hand there may be a dearth of nitrogen, but the soil may be richer in potash. It will be observed that vines not making excessive growth usually have a good crop of fruit, while others that make vigorous growth very often have a poor yield of fruit. This being the case I do not think it prudent to top the former, as the vitality of the vine appears to have been taxed, and in that case topping would prove injurious to it, because it could in no way act as a stimulant. On the other hand, the vine grows so fast that the sap is taken by a few of the stronger shoots at the end of each cane. Frequently during winter pruning the pruner experiences great difficulty in securing suitable canes on the lower part of the old rods, because, in many cases, the buds failed to shoot, while others shoot late in the season after

the main flow of sap has been expended. So far as fruit-bearing wood is concerned very few of those late canes can be utilised, as they are not sufficiently matured for that purpose. It will be found that during the early period growth is so rapid that the first buds are not properly matured, while later on, after the sap subsides the buds become more matured, and possibly this may account for the tendency to shoot from the extreme ends of the canes. I consider that by topping the vines you are preparing for the following year. As the topping is not done until after the fruit has set it can have no effect on that particular crop, but it checks the flow of sap, and the buds and the shoots that will be used as canes for the following year are thus allowed to develop, and this will cause a more even distribution of the sap. Instead of the growth being from a few buds at the end of each cane, it is distributed along the whole length, and the vine having more to do does not grow so fast, and the fruit has a better chance of setting." In answer to questions, Mr. Wescombe said that strong growing vines should be topped in November, but shoots should be left long enough for canes for the following year; 18in. was long enough for Sultanas, and 1ft. would be sufficient for currants, as they were spur-pruned. Topping of currants at three years would have the same effect as cincturing. He found that topping Sultanas was better than cincturing. He advocated low apricot trees, and contended that a man standing on the ground could pick much more fruit than he could if on a ladder. It did not pay to dry the crown slabs or culls. Regular thinning and cutting back every second year would be conducive to regular cropping and the forming of the fruit buds low down on the trees. In topping apricots care should be exercised to leave rather more wood than was required for the following season, as the laterals formed just below the cut, and could then be cut off by one cut when winter pruning was being done, thereby saving a lot of labor.

Coonalpyn, October 25.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. Wall (chair), Bone, Gurner, Cronin, Talbot, R. F. Venning, Good, Watson, J. Hill (Hon. Sec.), and seven visitors.

FARMING MALLEE LAND.—In a short paper Mr. Gurner said the usual plan of bringing mallee land under cultivation was to roll the scrub well and cut the springbacks before the end of the year, say, during October to December inclusive. When this was done the sticks should be picked up, a good break ploughed all round, and a fire started on a suitable day during April. On two occasions he had burnt on the 4th or 5th of May and secured good results, but it would have been better had the burning been done earlier. Following on this the land should be ploughed to a depth of, say, 4in., roots and stumps picked and carted off, and after the first harrowing the land should be again ploughed across the first ploughing. This should be followed by the harrows and once again stumps should be picked up and carted off. A crop of wheat or oats that would give a plentiful supply of straw for a burn after harvest should be sown, and this method should ensure good clean crops in future years. The strong mouldboard plough was the best for the first two breakings up, and after this the disc implement could be advantageously used. This method entailed a good deal of hard work, but it saved considerable trouble, in that it obviated a lot of bush cutting. This procedure might not perhaps be suitable for large areas, but nevertheless it would be found very suitable for the average farm.

Hooper, November 30.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. J. R. Beck (chair), T. Nicolle, C. S. Hall, W. N. Pearce, W. J. Pearce, A. Hood, R. J. Chenoweth, B. Chenoweth, G. Masson, C. B. R. Wright (Hon. Sec.), and two visitors.

HAY-GROWING.—Mr G. Masson read a paper on this subject, in which he drew attention to the trouble that was occasioned by the lack of provision of hay on the part of farmers in this district during the past season. He was of the opinion that a sandy slope was the best site for a hay crop in either a dry or wet season, and it would be found that the centre of the slope was as a general rule more productive than either the top or bottom. In the new country, where there was an absence of fallow, it was advisable to thoroughly work the land before seeding, after having burnt off the previous year's stubble and ploughed in any well-rotted manure that was available. Ploughing should be followed by good harrowing, and the harrows should again be run over the land after

the drill. In the event of a good fall of rain being experienced when the crop was about 3in. or 4in. in height the harrows could be again used, and this should result in a better stooling, in addition to the conservation of moisture. He was favorable toward the policy of mixing wheat and oats in the stack, the oats slightly predominating in quantity. Continuing, the paper said—"The best hay wheats are White Tuscan (good straw, nice color, and good flag and head); Dart's Imperial, or Bluey, having similar qualifications; and Marshall's No. 3, which is a good wheat for both grain and hay, and in the event of not growing high enough for hay, would reap well. Le Huguenot is absolutely a hay wheat, growing to a great height, having a solid straw, and seeming to be very sweet and palatable to horses, as they will, when given a sheaf, clean it right up, while with other wheats they will only eat the heads and part of the top of the culm. I favor growing an oat that would give a maximum amount of culm, such as Calcutta Cape or the New Zealand Dun. In this district Algerian seems to grow very short and heady, but it is undoubtedly the best forage oat. Hay crops should be sown early. In the event of a late season it does not pay to wait for the rain to fall before putting in the crop. The oats should be sown, and then the hay wheat, if of a late variety, and if rain is still wanting more oats should be sown. The palatability and the nutriment of the food depend largely upon the time when the hay is cut. The tendency of the average farmer is to cut the wheat a little on the ripe side. Immediately the grain has formed into the doughy stage, and when the lowest internode of the culm begins to turn color, the plant ceases to take any food or nutriment from the soil. Therefore it must be all stored in the whole plant, but when the grain begins to harden the nutriment then in the culm goes into the grain. It is better to have all the nutriment distributed in the straw than to allow most of the nutritious matter to go into the grain, of which in a bag of chaff there is only a small bulk. Wheat should be cut when the grain is in the milky stage, thus getting a maximum amount of nutriment in a maximum bulk. Oats should be cut when dead ripe or well on the ripe side, especially Algerian, which if cut green is not palatable on account of the bitter taste. Wheat and oats mixed in the one crop are not always at the right cutting stage at the same time, though in cases they may be if the wheat is of a very late variety."

Monteith, November 23.

PRESENT.—MESSRS. TRAVERS (chair), Male, Eldridge, Murphy, W. J. McCulloch, Magor, T. R. Smith, Connell, Gregory, Carter, Wells, Bradford, J. Rowan, J. Rowan, jun., McDonald, J. Ferries (Hon. Sec.), and five visitors.

TESTING A DAIRY HERD.—Mr. Rowan read the following paper on this subject:—"If dairying is to be made a success the dairyman should keep a record of the milk produced by the cows he is milking, weighing each cow's yield separately every morning and evening. If we also test every third month, with the Babcock tester, we will soon know which are the good cows. Where there are 30 or 40 cows and several milkers, the herd should be divided and each milker apportioned his own animals. These soon recognise their milker and will frequently give better results when milked by him, than they will to another hand. They should also be milked in regular order; the cows first milked in the morning should be milked first in the evening. Two scales should hang in a convenient place for weighing, and the weights of each milking should be marked down on a board. These can afterwards be copied into a book. The weighing creates more life in the dairy; each milker endeavors to get the most from his cows. It makes him strip well, and it is the strippings which contain the most butter-fat. It may take a little extra time, but it pays in the long run. At the end of the year you know how your herd is milking individually, and you may get some surprises, and some vigorous culling may be necessary. A cow should give 6,000lbs. of milk in a year. It may be a high standard, but this quantity should be made the minimum to aim at, and as much more as possible should be obtained. I have had cows producing 8,000lbs. in 50 weeks. My experience has convinced me that the Murray swamps are the best lands in the State for dairying centres. With a dry climate, and an abundance of succulent fodder all the year round, the milk supply can be kept the same each month in the year. Then there is an abundance of good water. Mount Gambier is unquestionably an ideal spot for dairying and intense culture, but it must give way to the Murray River in time to come. At all times cows should be gently treated, but especially during the milking operation, as a portion of the milk is being then secreted and rough usage will inevitably shorten the supply. A milking stool is not the best coxer which can be used. Never allow cows to be hunted or driven in by dogs. For the production of a regular supply of milk it should be arranged that the cows calve at different periods of the year. It is easier to keep up a regular quantity of milk

during the winter months with cows that calve at the end of the year than with those calving in spring, as the latter give a larger quantity for a few months only, and the milk decreases largely directly the grass fails. It has been conclusively proved that cows calving in winter give a third more milk within their milking period than do cows calving in spring. Besides this the winter calves are more easily reared, the proportion of loss not being a tenth of that with spring calves."

Renmark, November 26.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. W. H. Waters (chair), H. De Witt, W. E. Muspratt, J. S. Huggins, M. B. Geneste, H. S. Taylor, R. Nuthall, H. D. Howie, T. Cole, E. H. Williams, W. E. Snow, C. J. Everard (Hon. Sec.), and one visitor.

PEACH-GROWING.—Mr. Geneste read the following paper on this subject:—"The peach is closely allied to the cherry, the plum, the apricot, and the almond. It originated in the East, and in China has been cultivated for centuries. The tree blossoms before the leaves appear, and the leaves and kernels have a strong flavor of prussic acid. A good article of brandy is made from the peach, but it is said, on account of the prussic acid it contains, to be a very dangerous tipple if indulged in too freely. The best soils for the growth of this fruit are light, deep, sandy loams, rather dry than moist, but under all circumstances well drained. In Renmark the best box country, with good drainage, has proved very suitable for peaches, producing heavy crops and well-grown trees; one orchard on the Avenue, planted with Early Crawford, yielding up to 2 tons of dried fruit to the acre. Too much stress, however, cannot be laid upon the importance of good drainage, without which young trees will soon show signs of going off. The peach, when grown on its own stock, seems to be of all fruits the most sensitive to alkali. Thousands of trees have perished in California because they were planted in retentive soils without drainage. The peach fruit is always produced on the wood of the previous year, and pruning is, as a rule, done when the trees are out in blossom. The trees should be well thinned out and kept open in the centres, the tendency being in some varieties to overbear. The Lady Palmerston bears very heavily year after year, and this tendency, together with annual visitations of aphid, has accounted for one orchard of three acres dying out in Renmark. The Elberta is not subject to aphid, at any rate none having ever appeared on my trees. This variety is subject, however, to curl leaf, but this need give no anxiety, as one spraying with Bordeaux mixture, just as the blossoms are bursting, is sufficient to ensure clean trees. [Formula—Lime, 4lbs., bluestone 4lbs., treacle, 4lbs, water 30galls. to 40galls. Procure new lime, slacken enough for use. To each 4lbs. of slackened lime add water enough to mix, then add treacle and make 28galls. to 38galls. of lime treacle water. When about to spray, dissolve 4lbs. of bluestone with 2galls. of boiling water in a wooden vessel and then add this to the lime treacle water.] With curl leaf the leaves swell and curl, and are thick with puffs of a reddish color. They drop off in about three weeks, and new leaves come. Mild cases do not seem to injure either the tree or the fruit. Severe cases destroy the fruit and young future bearing wood. If left unchecked year after year the tree would probably die. The peach tree in Renmark has proved to be a very consistent bearer, the crop varying very little from year to year. It also has the advantage of coming into bearing early. I am indebted to Mr. Cole for the following particulars:—He planted three acres during September, 1907. Two and a quarter acres consisted of Elberta, and three-quarters of an acre of Lady Palmerston. In January, 1911, i.e., three years and three months after planting, he harvested 62½lbs. of dried fruit from the three acres, with a loss of 3cwt. owing to wet weather—fruit being ruined on the trays. In 1912 the crop amounted to 1½ tons of the dried product. The trees this year have a good show, and should return 2 or more tons of dried fruit. A good distance for trees to be planted is 20ft. or 24ft. apart. For the first two or three prunings the trees should be cut well back, with few main arms left, say about five, after which the main arms could be left long, care being taken to induce these arms to throw fruit spurs along their entire length. It is important to have the main arms of sufficient strength to carry heavy crops in later years. Many of the older trees in the settlement the main arms of which have been allowed to extend too rapidly, when carrying the crop have to be propped up, often with many props to a tree. This interferes with cultivation and all horse work. A great advantage with Early Crawford and Elberta varieties is that the fruit ripens in the case of the latter, after the apricots are over, and is packed, dried, and in the shed before the currants start. The Elberta picking starts about January 10th, the Crawford somewhat earlier. The picking costs considerably less than apricots, as the fruit suffers

no harm by falling on the ground when ripe, and at the right time the trees can be shaken and the fruit collected into picking boxes. Care must be taken not to allow fruit to lie on the ground too long if the weather is hot, as the burning sand scorches the peaches, and the scorched fruit when dried is quite dark and of a very poor quality. Drying peaches should cost less than half the cost of drying apricots. The Elberta dries out at about the rate of 6lbs. of fresh fruit to make 1lb. of dried. The fruit is of a uniform size, giving practically no slabs, and a very large percentage of four-crown. The Elberta is subject to split stone. A much larger proportion, however, is usually affected in the first few pickings. It requires a lot of sulphur, generally taking about six hours to eight hours in the sulphur house, and in cold, windy weather, longer. If difficulty is found with the sulphuring, a good plan is to sprinkle the trays or ground in the sulphur house with water. The peach requires to be well manured when in full bearing, receiving, say, 3cwt. of super. or bone super., and 1cwt. of sulphate of potash to the acre; and 1cwt. to 1½cwt. of sulphate of ammonia later, when the trees are well out in leaf. The Early Crawford and Lady Palmerston varieties have returned the largest crops in Renmark, up to 2 tons of dried fruit being gathered from one acre. The Elberta has not given such large returns, 3½ tons of dried from three acres being the best result in my own case. The peach in Renmark has up to now proved itself capable of withstanding adverse climatic conditions, and I believe I am correct in saying that within the last 10 years there has been no failure of the crop in any year. This, with the good prices obtained, ready sale, and no export, has proved a good investment for the peach grower. The Elberta is suitable for canning." In discussing the matter, and in reply to questions, the paper writer stated that experiments in the shortening back of peach spurs had been tried, but the practice was regarded as inadvisable. Mr. Muspratt thought the method of allowing the peaches to drop might be suitable where nice sandy soil existed, but the fruit would be badly bruised and knocked about where the trees were growing in heavier land. If the fruit were not quite ripe at the time it fell it could be placed aside for awhile, when it would quickly mature. Mr. Cole mentioned that where spurs of the Early Crawford variety were shortened back it was found that all the crop was cut off. His plan was to leave one spur untouched, and prune the other back. In the opinion of Mr. Waters the Lady Palmerston was the best drying fruit, and the Muir and Foster varieties were quite equal to the Elberta.

WHOLE-DRIED APRICOTS.—A reference to the drying of apricots whole, and to the Trade Commissioner's report that it was a mistake to send fruit so treated to England, drew the statement from various sources that it was extremely difficult to get uniform results from the drying of whole fruit. Mr. Ollsen was mentioned as a Renmark settler who had been most successful in getting a good sample of whole-dried apricots. His method, it was stated, was to keep the fruit in the sulphur house for three hours—in the sun, and then to dry it in the stacks. Fruit so treated had kept its color well for two years. Mr. Muspratt remarked that the drawback of stack drying was the extra liability to trouble from weevils. Mr. de Witte stated that these could be destroyed with bay leaves, and Messrs. Muspratt and Cole remarked that the dried figs of commerce were usually packed with bay leaves.

PRUNING THE PEAR.—For the purpose of bringing a pear tree to shape Mr. Agars stated that it was a good plan at the winter pruning to cut to an inner bud and summer prune the shoot. The summer pruning would cause the outer bud below to shoot out, and this would then grow outwards. Mr. Muspratt mentioned Mr. Wescombe's plan of forcing the branches to grow outwards by means of a stick, nicked at each end, and fixed like a "spreader" between opposite shoots. A hoop might be used instead of the sticks. The Glou Morceau was mentioned as the hardest of all pear trees to shape out, all the sap running into one limb. Mr. Howie thought Winter Nelis was toughest, and considered that Glou Morceau should be pruned to a pyramid shape.

Tintinara, November 30.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. R. J. Gully (chair), C. P. Hodge, Bamgers (2), Filmer (2), R. R. Henderson, A. K. Wendt, Stead (2), J. Donaldson, D. G. Kennedy, Bell (3), C. M. Ives, J. Helling, M. F. Hodge (Hon. Sec.), and three visitors.

MANURING.—Mr. A. K. Wendt read a paper on manuring and quoted extensively from "The A.B.C. of Rational Manuring," by Renard. He referred to the fact that the warm climate of Australia was conducive to the fixation of nitrogen in the soil from the air, and where additional applications of this plant food were needed urged the practice

of green manuring with leguminous crops. The importance of a sufficiency of lime was touched upon, this being a corrective of acidity, making the soil more retentive of moisture, warmer, and generally of better physical condition, in addition to encouraging the activity of beneficial soil bacteria and making available various plant foods. The writer also dealt with the importance of farmyard manure in its relation to the upkeep of a sufficiency of humus in the soil. Renard, he said, advocated the application of phosphatic guano or basic slag to the fallows and the subsequent use of superphosphate with the seed as a starter for the crop. The paper was much appreciated by members, and was well discussed. The Chairman advised all members to burn a kiln and apply lime to the land at the rate of 5cwt. to the acre. Mr. Wendt advised sowing Thomas phosphate on the fallow in October, but not to bury it deeply. He had tried an experiment with nitrate of soda, scattering it broadcast by hand on the growing crop on a damp day early in September, and had noted a marked improvement, the crop showing more growth, better flag, and larger heads.

MANAGEMENT OF BEES.—The following paper was contributed by Mr. J. Helling:—
“There are many terms used in connection with bees which are liable to be wrongly applied. Any community of bees may be called a ‘colony,’ but generally the term is only applied to bees established in a dwelling provided by man. Colonies in trees, &c., are known as bees’ nests. Communities of bees on the wing are called swarms when they are clustered away from the hive. Every normal colony of bees in the active season consist of three classes of individuals, viz., queen, a large number of workers, and a number of drones. The queen is the mother of the other bees, and the only fully developed female. The workers are sexually undeveloped females, and constitute the largest part, numbering from 40,000 to 50,000 in a strong colony. The drones, which are larger than the workers, are the males, and their only use in the economy of the hive is to mate with the virgin queen. Towards autumn, when they are no longer required, or at any time when there is a scarcity of nectar, they are driven out of the hive and left to die, excepting in a colony with an old or failing queen or a queenless stock, both of which will retain the drones. The queen deposits the eggs in the comb-cells during the breeding season, after the cells are prepared for her by the workers. The life of a queen is about three years, and under favorable conditions she will deposit up to 3,000 eggs in 24 hours. Eggs in the ovaries of the queen are all alike as to sex; the act of fertilisation that is to produce a queen or a worker takes place when the egg is on its way out. The egg producing a drone is unfertilised. The development of drones takes 24 days, workers 21 days, and queens 16 days. The situation of an apiary has to be considered. Keep the bees in some quiet corner of the orchard sheltered from the weather and hot sun. They do not like noise of any kind; it often causes them to swarm. Bags should not be used as a covering to hives. They only form a harbor for spiders, moths, and other enemies. I favor the Langstroth hive of eight to 10 frames. The kerosine case is a thing of the past. The Langstroth hives are very simply made, any handy man can make them from good $\frac{1}{2}$ in. boards. Thin boards warp with the heat in summer and the combs melt, causing wholesale destruction in the hive. It is wise to use a complement of frames, although some people think it economical to use only half. This is not advisable, as in some seasons the bees collect pollen and build up storing space, as it were, and with only a limited number of frames to work on when the honey-flow commences they build across the corners and bridge the frames together. Full comb foundation, instead of a narrow strip, saves the bees a lot of work, and I favor the very fine quality, with the object of obtaining a larger yield of honey than would be possible were they allowed to build this comb in their own way, a stronger force of working bees, faster building of brood comb, and fewer drones. Drones are only consumers, and their numbers are best regulated by preventing the building of drone comb. In an apiary there is no necessity for a large number of drones, as a limited number is always being raised in each hive. A sheet of foundation comb contains about 3,400 cells on each side, while the same area of comb composed of drone cells would produce only about 3,000 drones. The amount of work and floor required to raise those drones would probably raise 3,400 workers, but while the workers from a few days after hatching engage in productive work, the drone remains a consumer to the last. I believe in extractors; they are very cheap, and will pay for themselves in a short time. When the surplus honey is taken by this means the empty combs are returned to the hive to be refilled over and over again. In a good district with a fair honey flow, one large swarm will fill a section with honey in the same time that would be occupied in building three brood combs. The best time to take honey in this district is in April and September. Each strong swarm should produce up to 80 lbs. of honey during a season, and with honey quoted at 2½d. per pound profit will result from the keeping of bees. However, bees are generally too much of a ‘fighting’ proposition for the average farmer. When handling them it is a mistake to use too much smoke, which only makes

them drowsy and hard to move about. The best appliance is what is called a 'smoker,' and a few puffs is generally all that is necessary to quieten a swarm. Above all do not get excited. For observation purposes a sheet of glass over the top of the hive is an excellent idea. Great care should be taken not to kill or injure the queen, as a queenless stock will pine away and die. Scraps of comb should not be left lying about the hive, as it encourages robbing. Bees prowling around find honey, and they become bolder by degrees and will attack any poorly defended hive. Then a neighboring hive, attracted by the commotion, joins in, and shares in the plunder, and, of course, the weakest goes to the wall. The swarming season is now at hand and beekeepers should take steps to prevent, as far as possible, excessive swarming of their colonies. To the beginners the issue of swarms is a source of delight and the most convenient way of increasing the number of colonies. When, however, sufficient colonies are already possessed swarming becomes a trouble and worry, involving a considerable amount of unprofitable work, and may result in the loss of all the surplus honey. The principal inducements for bees to swarm are—first, the crowded condition of the hives; second, the presence of a large number of drones; third, an old or failing queen. The presence of an old queen may be detected during the first or second examination of the hive by noting the irregular way the eggs are laid, as they are found scattered about instead of being in a compact circle. To prevent swarming keep a supply of comb surface on hand. A super of frames with starters, or even full sheet of foundation, has every little effect on checking swarming. Whatever may be done to prevent excessive swarming by the timely addition of supers of empty combs, there will still be a considerable number of swarms. The season also has a lot to do with it. Some swarms, after they have been put into a hive will swarm out again. I find it is a good plan to close up the entrance for a few days until they get used to the smell of the new hive. To have a swarm that has clustered on a tree, if they are near the ground, shake the limb and the bees will fall. Then place the hive on the top of them and they will go up. If the limb is high it is just as well to cut it off. Bees like plenty of water, and unless you make some provision for watering, they are a trouble at taps and horse-troughs. The best plan is to make small troughs, place them near the hives, and put in floats, otherwise the bees will drown. Colonies affected with foul brood are poor defenders of their homes and fall easy victims to robbers, who, in turn, develop the disease in their hives. In view of the heavy losses resulting from this disease when once it has obtained a strong footing in an apiary, and the amount of labor involved in its eradication, it is desirable that every beekeeper should be able to distinguish it in the early stages of its development. The first symptom of the disease is shown by the grub assuming an unnatural position in the cell, often presenting the dorsal surface to the observer. There are several remedies, but the most effective is to remove the swarm to a clean hive and frames and burn all the infected material. Fortunately, we are not troubled much with it in this district. Drugs are sometimes used in the treatment, but a solution strong enough to kill the disease will very often affect the bees and induce them to swarm. I have found that it is quite unnecessary to artificially feed our bees in these parts. The scrub supplies an excellent feeding ground for most of the year. The lucerne tree is very valuable for nectar, and no doubt the lucerne flower during the summer produces the better yield of honey. Primroses produce pollen during summer, and experiments have proved that bees assist in the fertilisation of orchard trees."

Walkerie, November 25.

(Average annual rainfall, 9in.)

PRESENT.—MESSRS. C. Burroughs (chair), W. Frahm, A. Lewis, J. Jachmann, S. Modistach, E. J. Burton, W. J. Green, J. Jones, R. Stanley, J. C. Walters, J. J. Odgers (Hon. Sec.), and one visitor.

POTATOES.—Mr. Burroughs considered January the best time to sow potatoes in this district. One crop was all that could be successfully grown without manuring, and it was not advisable to irrigate the land after the plants flowered.

SALT LAND.—Mr. Burroughs described a method of bringing salt land back to cultivation as follows:—"Give the land a dressing of about 4cwts. of charcoal to the acre. Plough this in 4in. to 5in. deep, then spread over 3cwts. of slack lime to the acre. Harrow the lime in with light harrows, then sow linseed at the rate of 4lbs. to the acre. This can be mowed down and the seed will do for commercial purposes; cattle will eat the straw. The next season wheat can be grown, the amount planted depending on the rainfall."

Members considered lime had in many instances proved equal to super. One member stated that a neighbor had experimented with a strip of each, and at the present time he could see no difference in the wheat. [A bushel or more per acre difference cannot always be seen. The test will be when harvested, measured, and weighed.—ED.]

SOUTH AND HILLS DISTRICT.

Cherry Gardens, November 19.

(Average annual rainfall, 35.3in.)

PRESENT.—Messrs. S. Chapman (chair), T. Jacobs, G. Hicks, C. Lewis, H. Jacobs, J. Tozer, H. Lewis, T. Jacobs, jun., J. Lewis, A. Broadbent, S. H. Curnow (Hon. Sec.).

MINOR INJURIES TO STOCK.—Mr. H. Jacobs read the following paper on this subject:—“Every owner should make it a practice to look over his stock at least once every day, and not wait until he accidentally comes across one that is injured. Stock are always liable to injury, and the owner should be prepared to sacrifice a little time and expense for their relief where necessary. If the trouble is serious he should secure the services of one with more skill than the ordinary stockowner possesses. On several occasions I have dealt with such mishaps as cuts and stakes. These should be kept as clean as possible. Bathe them well with Condy's fluid and apply a little carbolic. Look after them regularly, do not simply dress the wound once and expect it to be cured straight away. Lameness in cattle is often caused through the toe of the hoof growing long and breaking away until it exposes the quick. This mostly occurs when the horses are brought up on plain country, where there are no stones or gravel. For treatment take a saw and cut away the overgrown portion of the hoof, so that the animal can walk without irritation. Prevention is better than cure, so a better plan is to trim the hoofs before they reach this stage. A small stick or stone may sometimes cause lameness through working in between the claws. It takes little time to remove this. Grass seeds are another source of worry to stock, the animals often getting a good collection of them in their mouths. Seeds may also find their way into the eye. If so it needs immediate attention. I think it little use forcing stock that have got down and are unable to rise. After putting them in a good position, wait until they attempt to rise on their own accord, and then be in readiness to give them a lift. If it is only to steady them a little it is a good help.” Mr. T. Jacobs pointed out that in the case of cuts or stakes, all foreign matter should be first removed from the wound. He also drew attention to another common occurrence—cattle knocking off a horn. If bleeding freely, the part should be treated with stockholm tar. If, however, the horn had only shelled, and it was not discovered until dry, little could be done. Mr. Curnow asked the best way to remove maggots from neglected wounds. Mr. T. Jacobs found one dessertspoonful of carbolic acid to 1gal. of warm water well syringed into the wounds most efficient.

BREEDING CHICKS.—Mr. T. Jacobs drew attention to a peculiarity in the hatching of chickens this season. In very many cases the young chicken seemed only able to chip the egg-shell, and then seemingly lacked strength to liberate itself by bursting the shell. He had had to liberate as many as four in a setting. If the chicks were not helped they soon died, and then presented a peculiar crushed appearance. Mr. Henry Jacobs had noticed the same trouble, and in cases it had been almost four weeks before the eggs hatched. Mr. C. Lewis had one egg that took five weeks before it hatched, and the chicken afterwards died. On one occasion he set one hen on Tuesday and another on Thursday, and both settings chipped the same day. He noticed that some eggs did not chip, but cracked right around. Mr. G. Hicks always set his hens on the ground, and he reported a most successful season. Mr. Lewis said some of the eggs which he had set had collapsed quite flat. Mr. Jacobs had secured a 50 per cent. hatching, and other members reported poor results.

Hartley, December 18.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. F. Lehmann (chair), S. Pratt, W. Richardson, A. Wunderlitz, W. Cross, F. Burns, W. Birmingham, H. Cross, and J. Stanton (Hon. Sec.).

UTILISATION OF BREMER RIVER FLATS.—Mr. F. Lehmann read the following paper :—
 "The river flats at present give good results, but, considering the richness and depth of the soils, we should get better. At present they are cropped for hay or used for pasture, yielding early winter grass. The flats vary from dark, rich soils on the upper reaches to light, sandy ground in the lower hill country, and rich sandy and loamy soils on the lower levels. The small flats among the hills are left for natural pasture, which mostly consists of silver grass and geranium. If sown to lucerne or rape they would grow splendid crops without irrigation. Further down, where the flats are used for haygrowing (they are very seldom left for grain, as the sample is poor), they have become wheat sick and dirty with weeds. By the adoption of a rotation of crops, such as rape, maize, and lucerne they could be continuously cropped without any loss of soil fertility. They would also provide green fodder for a small herd of dairy cattle during the summer months. After an early hay crop is taken off they could be ploughed and sown with maize or rape, and during a season like this would produce nice fodder. But lucerne will give the best results. There are quite a number of banks on the Bremer that are covered with a light sand by heavy floods, and these portions are well adapted to lucerne. The difficulty is to prevent sand drift till the young plants get a start. The best plan is to plough and harrow the land down fine, and then spread half-rotted straw or horse manure, well mixed with straw, over it; then sow the seed, either broadcast or with a drill, through the manure feeders. Take off the hoes so that it will spread better. Both sand and seed should be weighed or measured and mixed. Then roll the seed bed several times, pressing both the seed and the manure into the soil. On the smaller creeks a number of flats could be put under lucerne cultivation and irrigated, as there is sufficient water in the pools alongside. An 8ft. or 10ft. windmill is not very expensive to buy or keep in repair, and it is capable of lifting enough water to grow tons of greenfeed. Other places could be watered by gravitation in open drains, and the hydraulic rams could be used in quite a number of places." In discussing the subject members were agreed that the majority of flats on the river would not produce crops in the summer months unless they were supplied with plenty of water.

Ironbank, December 20.

PRESENT.—Messrs. C. Morgan (chair), R. Coats, E. Coats, Alex. Coats, W. Coats (Hon. Sec.).

ORCHARD CULTIVATION.—The following paper was read by Mr. R. Coats :—"It is a great advantage to fruitgrowers to get their trees and vines in good healthy condition in the summer months to carry the coming season's crop. This involves time and labor, especially in the hilly districts, where the orchards are set on ground steep and difficult to work with a horse. The trees should be carefully watched for pests and fungus diseases. Affected trees should be dealt with as soon as possible. Spraying should not be neglected, especially where pears and apples are concerned. The orchards should be kept free from all litter that would provide shelter for insect pests, and the soil should be surface-worked at intervals through the dry weather, for the purpose of retaining moisture. Pinching, or summer pruning is necessary in orchards that have been pruned heavily. This will strengthen the tree and save a good deal of time when the pruning season comes. All fallen and diseased fruit should be gathered up and destroyed to prevent further infection."

Mount Pleasant, December 13.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. H. A. Giles (chair), P. J. F., and J. S. Miller, W. Roesser, G. A. Vigar, and D. C. Maxwell (Hon. Sec.).

VARIETY TESTS.—The members took the opportunity of visiting Springton for the purpose of inspecting the plots of wheat, oats, and barley which were being grown by the local school teacher, Mr. Booth. In all, about 70 varieties were under cultivation on land which had been prepared in the ordinary manner for the growth of crops. Some of the varieties showed to very good growth, whilst others were somewhat inferior,

STOCK AND CROP REPORTS.—The crops were reported to be the best grown in the district for a number of years, and stock were doing remarkably well. During the month of November 1-89 points of rain fell.

Uraidla and Summertown, November 4.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. E. Hart (chair), H. G. Dyer, A. Moulds, T. H. Collins, W. Pappin, R. V. Cobbledick, E. Hawke, R. H. Shenard, J. Rowe, W. Squires, W. Kessell, G. Prentice (Hon. Sec.).

STOCKS FOR CHERRY TREES.—Members were of the opinion that cherry trees should be worked to seedling stocks, and some varieties cropped considerably heavier when worked from Kentish stocks. The disadvantage of using the latter, however, was that a lot of suckers were thrown.

WASTE PRODUCE.—Mr. Johnson expressed an opinion in favor of ploughing in all waste produce unless it were in a diseased condition, when it was advisable to burn it. Mr. Cobbledick favored the latter method in all cases, as it went a long way in the direction of preventing diseases. Mr. Kessell thought it better to mix the produce with farmyard manure, and, after allowing it to lie for some months to decompose, to distribute it on the land.

SOUTH-EAST DISTRICT.

Glencoe, November 18.

(Average annual rainfall, 33½in.)

PRESENT.—Messrs. A. Dow (chair), J. Dow, W. Childs, jun., W. Holloway, W. D. Mitchell, F. A. Telfer, J. Riddoch, jun., and G. F. Ferguson (Hon. Sec.).

SUMMER FODDER CROPS.—The Hon. Secretary contributed the following paper on this subject :—" Anyone making a tour of this district during the late summer and autumn months could not fail to be struck with the almost entire absence of summer fodder crops. In a great many districts feed for stock is scarce in the winter months, but in this district the stock can generally find plenty of greenfeed. However, after harvest the stubbles are gleaned in a few weeks, the small grass paddocks are bare, and in the loose soil the horses begin to pick up sand, and the supply of milk from the dairy herd is exceedingly scanty. For these reasons we should certainly make some provision for growing fodder crops to tide the stock over the lean months, maintaining them in better health, and incidentally increasing our profits. There is no doubt as to the suitability of our soil or climate for the growth of prolific summer crops, but for some reason this has not been made a part of the ordinary farm practice, possibly because the potato-planting and subsequent working absorb all our attention at this particular time. Lucerne is the best crop to grow, although it can hardly be called a summer crop. A well grown plot of lucern will give the most satisfactory results, but the preparation of the land needs careful attention. Weeds thrive in our soil and interfere with the lucerne. It is necessary, therefore, to eradicate the weeds before sowing the lucerne. Too much care cannot be exercised in the selection of the seed. It is policy to pay a higher price and get seed true to name and free from dodder. Ten pounds to 12lbs. of seed per acre is the usual rate of sowing, and I prefer broadcasting to using the seed drill. Care must be taken not to bury the seed too deeply. If the lucerne were sown in the autumn it would be advisable to sow half a bushel of Cape barley to the acre to protect the tender plants from the frost ; and if sown in the spring it should be early in September so that the plants will be well established before the hot weather sets in. Of the true fodder plants I prefer maize, which should give a heavy yield of succulent greenfeed in this district. The different varieties of sorghum are excellent fodder plants, but when in the green stage are poisonous to cattle.

There is not this danger with maize, and the feeding value of it is high, added to which all classes of farm stock eat it readily, and it is a crop that is quickly and easily handled when feeding. Maize may be sown any time between September and Christmas, and the land should be ploughed and sown in drills in the same manner as is done with potatoes, in order that the scarifier may be used to cultivate between the rows. It would be wise to make successive sowings in order to prolong the reaping time, for if a large plot is sown it may not be possible to use it all to the best advantage. Another crop that could be grown to advantage for summer fodder is field peas. I have grown several splendid crops of grey peas, but the ravages of grubs have spoiled them as grain; but they would be found excellent for grazing. Peas are not only a splendid fodder, but they are soil renovators, collecting nitrogen from the air and storing it in nodules on the roots, thus making a supply of nitrogen available for the succeeding crop. They are also instrumental in keeping weeds in check. It is said that a crop of peas will clean the land of that potato trouble known as 'blister' or eel worm; but they would be a profitable fodder crop if only for their value for fattening stock, for the restoration of soil fertility, and as a weed eradicator. They should be sown in August at the rate of 2 bush. of seed per acre with 1 cwt. of superphosphate. They will then be ready to feed off early in the following year, and what the sheep may miss the pigs will gather. Other good summer fodders are kale, thousand-headed cabbage, and chou moulrier, allied plants and yet differing in manner of growth. They are all hardy, and when once established will withstand heat and dry weather well. For small quantities the seed may be sown in beds to be transplanted to permanent quarters later, or the seed may be mixed with bonedust and sown through the manure box of the drill, every fourth hoe being used, which will make the rows 28 in. to 32 in. apart, and allow room for working with the scarifier. One and a half pounds to 2 lbs. of seed per acre is sufficient, but care must be taken that the seed is not buried deeply, for it is small and needs only a very light covering. For feeding to cattle it is necessary to pull the leaves and cart them out, and this entails a good deal of work; but sheep or pigs may be turned in to help themselves, although sheep should be removed in the event of rain falling or heavy dews followed by a hot sun, or the result may be the loss of some stock from bloat. Kale is a deep-rooting plant, penetrating to a depth of 5 ft. or 6 ft., so that it is a subsoiler, and it is no easy matter to root out the plants to make way for the succeeding crop. Chou moulrier is a surface-rooting plant, and would be more easily removed; but possibly through drawing its supplies from the surface soil it may make greater demands on the land. The thorough preparation of the land intended for any fodder crop is important. It is a waste of time, energy, and valuable land to have a crop come up indifferently or choked with weeds, and while it is not always possible to avoid failures, forethought and care will reduce them to a minimum, and we will not then pronounce these crops as unpayable and unworthy of our attention." In the discussion which followed Mr. A. Dow said that summer crops were risky, which was the reason they were not grown more in the district. His maize crop had been ruined by grubs, and mangolds and carrots were choked by sorrel. Mr. W. D. Mitchell considered peas a winter crop. Mr. W. Holloway had tried to establish lucerne, sowing both in autumn and spring, but had not been successful owing to weeds. Mr. Jas. Riddoch said he had about a quarter acre of lucerne which he valued highly, but it had been difficult to establish. Last year he had fed four horses on it through the potato-planting season. Mr. J. Dow had tried lucerne for several years without success. He sowed in April on two occasions, but the germination had not been satisfactory; then he sowed in September and got a good plot established. The seed was of the Hunter River variety, and grew well both in summer and winter; but another variety he had tried made no growth at all in the winter. This season he had sown two packets of seed, both supposed to be Hunter River, but the growth had been entirely different. He found that lucerne needed to be well manured. He did not know whether peas would check blister in potatoes, but believed that lucerne would. Mr. W. Childs mentioned the case of a person having a plot of lucerne on land which, when afterwards planted to potatoes, was clean, although the potatoes on the rest of the paddock were affected with blister. Mr. F. A. Telfer advocated mangolds both for summer and winter feeding. Mr. Telfer said that at Tantanoola the farmers carted mangolds direct from the paddocks and fed them to the cows with good results. Mr. J. Dow thought mangolds needed storing in order to mature.

Kalangadoo, November 9.

PRESENT.—Messrs. D. W. Tucker (chair), S. Tucker, A. Rake, E. Earle, G. Bennett, J. Boyce, D. McCorquindale, G. Riddoch, J. A. Sudholz (Hon. Sec.).

TOUR OF DISTRICT.—Members of the Branch made their annual tour of the district, visiting various homesteads, and inspecting crops, stock, &c. A most enjoyable and instructive time was spent.

Millicent, November 5.

(Average annual rainfall, 28½ in.)

PRESENT.—Messrs. G. Mutton (chair), H. F. L. Holzgreffe, J. J. Mullins, G. G. Serle, J. Bowering, W. Downs, H. Hart, T. Edgcombe, G. Major, S. J. Stuckey, H. Day (Hon. Sec.), four visitors, and Mr. Colebatch, Superintendent of Agriculture in South-East.

LIME AS A FERTILISER.—After reviewing the results obtained on the experimental plots in the district, Mr. W. J. Colebatch addressed the Bureau on the effects of lime as a fertiliser. He said that lime was not really a manure. A 30-bush crop of wheat absorbed in the grain only 11b. of lime from an acre of land, and yet in average soils there were thousands of pounds of lime in the first foot, and wheat roots went down several feet for their food. Although it was not required as plant food, it had the effect of liberating plant foods in the soil. Its most important effect was in neutralising the acidity of the earth. Most of the low lands required lime. Where the soil was submerged for any length of time the acids accumulated and kept it sour, and in a condition favorable for a prolific growth of such plants as docks and sorrel. A simple test which farmers might use to ascertain whether their land was sour or not was the ordinary blue litmus paper. It should be inserted in a slit in the earth and packed close, remaining there for three or four hours. He did not wish to convey an impression that if the color was unaltered lime was not needed, but it was an indication that the soil would benefit by the application of lime. Gypsum would never sweeten the soil. It released potash already there, and was appreciated by plants, such as potatoes. Three tons of gypsum only supplied as much lime as one ton of quicklime. In South Australia there was no guarantee as to the quality of the lime supplied. The State was very much behind the times in that respect. In New Zealand it could be purchased in any form desired, at from 15s. to £1 a ton, and the railway carriage over 100 miles was free. Lime was essential for the South-Eastern soils, and they should be able to buy it at a reasonable rate, and with a guarantee as to its strength, as was the case with ordinary manures. It had been demonstrated by experiments in Victoria and in America that for the purpose of neutralising sour land the ground limestone was equally as good as the burnt lime. Provided that they could get the stone cheaply (the cost of carting it, of course, would be double), and could get it crushed fine enough, they would find it just as effective as the ordinary burnt lime. Where 5cwt. of quicklime was recommended it would be necessary to use 10cwt. of the crushed product. On the very light soils quicklime should never be applied, as it burnt up the organic matter very quickly. Burnt lime should not be put on too near seeding operations, but the ground lime could be applied at any time. It tended to bind the lighter soils together, whilst it opened up the heavy soils. Lime was also one of the greatest stimulants to germ life that could be found. It rendered growth more rapid, brought the crops earlier to maturity, and improved the quality. The tendency was to adopt light dressings of 5cwt. or 10cwt., but he did not believe it was worth while putting on less than a ton to the acre. Where the rainfall was heavy, as in the South-East, and the soakage rapid, the lime would wash off, and 5cwt. represented a mere dusting. It would never be felt. If they could afford it, he recommended 2 tons rather than one as an initial dressing. The best machine he knew of for the purpose was the double disc cultivator, with the lime box between. They need not plough it in. It should be just covered. If it were intended to apply quicklime, it should be put on at least a month before the seed was sown, not only because of its effect on the seed, but because, if used when seeding, it would revert the superphosphates sown with the seed so quickly that they would never get through the soil. Lime also tended to keep potatoes very clean. The great advantage of lime was that it tended to make the phosphatic manures more effective. The application of lime would be the next move with regard to Australian manuring. It would be found as they advanced that soils containing as much as 5 per cent. of lime would still respond to the application of it. In plenty of cases, what lime did exist in the soil was present in a relatively useless form. In the course of the discussion which followed the lecture, the advisableness of co-operating in the purchase of a lime-crushing plant was referred to.

Referring to the experiments on Mr. R. Foster's farm at Rendelsham, Mr. Colebatch gave the following particulars of manurial tests, for the benefit of chicory growers (the quantity of chicory sown was 2lbs. to the acre):—Mineral super., 2cwt. to the acre, yielded 12-885 tons to the acre; 1½cwt., 9-228 tons; 1cwt., 8-829 tons. Basic slag, 2cwt., yielded 13-032 tons; 1½cwt., 9-903; 1cwt., 8-362 tons. No manure, the yield 7-041 tons. Bone super., 2cwt., 12-383 tons; 1½cwt., 11-1 tons.

Naracoorte, November 9.

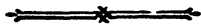
(Average annual rainfall, 22in.)

PRESENT.—Messrs. L. Wright (chair), F. A. Holmes, W. H. Smith, W. Loller, A. Caldwell, W. E. Rogers, J. M. Wray, A. Langelducke, jun., S. H. Schinckel (Hon. Sec.).

CARE OF HORSES' HOOFs.—Mr. W. Loller read the following paper on this subject:—
 “In preparing the foot for the shoe the aim should be to cut away so much of the wall as is required to bring it back to its natural form. As a rule the wall should be lowered to the level of the unpared sole. The sole and frog should on no account be pared or touched by the knife, nor should the heel be ‘opened.’ The horny sole and frog, unlike the wall, do not grow indefinitely, but when they have attained a certain thickness throw off the old horn in flakes or scales. This natural thickness of the sole and frog horn is an essential condition for the maintenance of the foot in health and its protection from injury. About all that is necessary is to remove these loosened and detached flakes. The angles between the bars and crust should be moderately pared out, as accumulation here with continued pressure of the shoe is apt to induce corns. The frog does not require more than the removal of ragged parts. The shoe should be nailed on firmly, yet not to break or weaken the wall of the hoof and interfere with the freedom of the quarters or enlargement of the foot as it grows. In its natural condition the outer rim or wall of the foot comes in contact with the ground first; second, the frog and outer edge of the sole; third, the centre of the foot and spaces between the bars and frog. In the way shoes are usually fitted the bearing surface is very much concave, tending to crowd the quarters together. The shoe should little more than cover the wall, excepting at the heels, where it should be so much wider and longer as to compensate for the growth of the foot, and be heavy enough to wear for the time it is expected to be on. Should an excessive thickness be required, the bar might be made wider to permit more wearing surface. It should fit closely to the bearing surface prepared for its reception so that it may give support to the crust and carry on its ground surface, as nearly as possible, the form of the wall before it was cut away. It is a rule recognised by the best authorities that the sole should not rest upon the shoe, except around the toe, where the outer edge is left full and natural; but if the wall is cut down close and the sole rather thin (in no case should it be done except for pathological reasons) it is advisable, if it comes too near the iron, to lower the part coming under it. As a rule the bearing surface should be level and the ground surface concave, or the inner edge of the ground surface so levelled off that it will not harbor stones and dirt and be so stiff that it will not bend. If the horse is expected to be driven only occasionally and upon common dirt roads the wear will be but little, and the shoes should be correspondingly light; but if much travel is required on stony or macadamised roads the weight should be sufficient to sustain such wear. The addition of a small piece of steel hammered well into the toe and tempered would add greatly to its durability. It would be much better to make them wholly of steel, as they would be very much lighter and less liable to bend. The nailing should hold the shoe firmly to the foot without injuring the wall, and leave the foot as independent of restraint by the shoe at the quarters as possible. The nails should be driven where there will be most secure nail holds, heavier nails being necessary in proportion to the thickness of the wall, weight of the shoe, and severity of the work. The wall is thickest and strongest at the toe or front, and becomes thinner and more flexible towards the quarters and heels, especially at the inner heel, where it is sometimes extremely thin and flexible. There has been much speculation in relation to the cause of this quarter giving out before the other, as nature evidently intended it to stand strain and wear equally with other parts. The cause undoubtedly is the interference with its mobility by bad fitting shoes and nailing so far back as to interfere with the flexibility of the quarter. This being true, it is evident that the principal nailing should be at the front, because there is more horn there and less liability of harm by separating and breaking the fibres of the wall. The nails should not extend any farther back into the quarters than is necessary to give a safe hold to the foot. The fewer and smaller the nails the better, providing they are sufficient to hold the shoe, but much will depend on the accuracy of the fitting, thickness of the wall, and weight of the shoe. If the nails are driven well back on the outer quarter and only round the toe of the inner side for the purpose of affording more freedom to the quarters, it will be found that as the foot grows the shoe will be carried to the outside quarter and toe to such an extent that the inner heel of the shoe will be drawn inside of the wall at the heel and rest upon the sole, causing a bruise or corn. In addition, so much of the shoe being left unnailed makes it liable to get loose and work under the quarter, which would cause a rapid wearing or breaking down of structure. All things considered, the best way is to nail back to the turn of the wall securely, or the nailing may be extended a little further back on the outside and shortened a little on

the inner side, in any case giving both quarters all the freedom compatible with security in retaining a firm hold of the shoe. As the foot grows the shoe will be brought forward so evenly under it as not to do harm. For ordinary light shoes six or seven nails evenly distributed around the front part should be sufficient, the outer nail sometimes being extended a little beyond or nearer the quarter than the inner one; but if the shoes are heavy, and the work hard, as for draught horses, heavier nails and from seven to eight in number will in most cases be required. A small thin clip turned up at the toe, and one at the outer quarter will help greatly in holding the shoe firmly in position, but they should be thin and set well out on the edge of the shoe. Very little of the wall should be cut away, just sufficient to enable the shoe to be brought to its position. The shoes should not be hammered down tight to the wall, but rest easily against it. If the foot is broken, or much weakened by the old nail holes, punch the holes where there is the soundest horn to nail to. The stamp form of punching holes should be used; that is, the hole made larger at the surface and smaller at the bottom, so that the nail heads will fit into it exactly. There are two methods of driving the nails, viz., starting the nail rather near the outer surface and driving high; and the other starting the nail deep and bringing it out low, which, I think, is best. If the nail is driven very near the surface it is liable to chip or break the horn out, which injures and weakens the wall very much, whereas driving deep and bringing out low insures a good hold, and the wall will be almost grown out by the next shoeing, consequently the holes should be punched deeply over those points where the wall is thickest, and proportionately farther from the outer margin of the shoe, where it is thinnest. The common method of fullering all shoes alike and driving the nails at the same distance from the edge can be no more adapted for all feet than can the size of the shoe itself. The straight-jacket way of punching all holes alike brings the nail holes to the same place at each shoeing, so that if the shoe becomes loose or is pulled off this part of the wall is liable to be torn off, or so split and broken as to leave only a soft imperfect horn. In re-setting such a shoe it becomes necessary to put it farther back under the foot in order to again secure a nailhold. Not only this, but the portion of the projecting wall being cut down to the shoe is left deformed and injured to an extent that several months' growth cannot repair. But if the holes be punched over parts that give a secure hold, the shoe can be nailed on sufficiently firmly to hold it without doing harm, and thereby preserve the symmetry of the foot. In such a case it may be necessary to nail rather close to the heels, but even this had better be done for a short time rather than risk injury and malformation by the method named. If a nail should be driven into the quick, which will be usually known by the horse finching, it should be pulled out at once, or should a horse show soreness after being taken out of the shop, the foot should be examined carefully by tapping over the part, and the nail at the point of soreness pulled out. When the nail is twisted off the end should be filed down to the proper length, and with the corner of the rasp or little punch cut out the pith or raised part under the clinch, and turn down lightly but firmly. The common custom is to make a deep notch with the corner of the rasp which extends across the face of the hoof from one nail to the other. This is so injurious that it should not be permitted even to the smallest degree. No rasping of the outer surface of the wall should be allowed, excepting to touch or smooth any roughness of the clinches, and to round off the edge of the wall near the shoe. The inner surface of the wall is soft and spongy, and as it approaches the outer surface it becomes hard and bony, and the fibres closer and denser, and the surface is a sort of skin or thin covering of enamel that prevents too rapid evaporation of moisture. It is, therefore, necessary to retain intact this strong fibrous horn as well as its outer covering, to hold the nails firmly, as well as to prevent the excessive evaporation of moisture which would follow should the shoe be too short, which is liable to happen. To remedy the difficulty it is the common custom to set it back under the wall and rasp the thick, strong wall extending out over the shoe down to it. The excessive rasping not only destroys the strongest part of the wall that is best able to retain the nail holes and support concussion, but causes a serious internal disease not usually understood, which shows its effect in an absorption of the bone beneath. Before preparing the hoof for the shoe the smith should go in front and look at it, to determine its adjustment. Sometimes the foot may be run over by having one side too high or the toe worn off. He should see how the feet are carried in a sharp trot: whether too high or too low, or whether the animal travels too close, endangering, interfering, or cutting. He should also see how the old shoe has been worn. The foot can then be taken up, when a look from the heel forward will enable an observing smith to determine how much and what part is to be cut away to level it to the proper proportion, and faults, if any, that can be modified or corrected. If the horse travels high the shoes should be light; if low and subject to stumbling they may be increased in weight a little, and the toe somewhat rounded; if liable to strike, then set the shoe close under the wall with the edges filed smooth. With

regard to the care of young and unshod horses' feet, I have noticed considerable neglect on the farm. In soft country the horses' hoofs need trimming or paring down frequently. When allowed to grow too long and out of the natural shape a deformed foot is likely to result, and it throws a false bearing on the tendon and other parts of the foot and leg. If horses' feet are looked after well they will stand a lot of wear on hard roads without shoeing. It is often want of paring down that makes a horse sore-footed. When horses' hoofs are allowed to grow too long they are generally spoiled. The hoof either becomes too straight or the heel gets too far under, and it cannot be got back in its natural place again. I contend that it is necessary to pare down the foals' feet at about six months old and attend to them from then onwards. Horses that are reared on soft country generally have bad feet, and those that are reared on stony country good, sound, shapely feet. Why is this? Just because the stony country wears away the hoof as it grows, and the hoof keeps in its natural form, and also becomes tough and resists more wear. In conclusion, I would advise all horseowners, especially farmers, to pay more attention to their horses' feet and they will find that it pays to have their horses walking more freely and at ease. It requires but few tools to attend to the horses' hoofs. A worn out steel from the chaffcutter will make the best toe knife, and then a hammer and rasp is all that is required for horses without shoes."



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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Farmers' Conferences.

The Annual Conference of the Upper North Branches of the Agricultural Bureau will take place at Quorn on Thursday, February 20th. The local Branch is making all arrangements, and an interesting agenda is in course of preparation. The speakers already secured are Hon. F. W. Young, M.P. (Commissioner of Crown Lands and Immigration), Mr. Wm. Lowrie, M.A., B.Sc. (Director of Agriculture), Messrs. J. F. McEachran, M.R.C.V.S. (Government Veterinary Surgeon), and P. H. Suter (Dairy Expert). Papers will be submitted by delegates from Branches in the Upper North District. Several members and the Secretary of the Advisory Board will also attend. The Northern District Conference is to be held at Saddleworth at the end of March, probably on the 27th. Full details of arrangements will be published in the next issue.

Dry Farming and Stock-Raising.

At the International Dry Farming Congress the prevailing opinion was that dry farming should include stock-raising. By this means it was generally agreed much of what was taken from the soil could be returned to it and the soil products could be utilised right on the farm. A subject for experiment is the growth of soiling crops for stock maintenance upon the dry farm. Another important question on which opinion was divided is the best manipulation of the manure resulting from the keeping of stock.

Working Brood Mares.

If we are careful in management, states an American writer, there is no danger in working the brood mare when she is in foal. Judiciously handled she will produce a more vigorous foal than if she was not worked at all. The mares should not be allowed to strain themselves in any way. It is possible to give the pregnant mare the easy end of the deal. Brood mares should not be allowed to run with the other horses because of the danger from kicking.

English Potato Crop.

The total production of potatoes in England and Wales for 1912 was estimated at nearly 2,244,000 tons, which represents on an area of 463,000 acres a yield of 4.85 tons per acre, the lowest since the returns of produce were first collected in 1884. The worst return previously was 4.97 tons per acre in 1900.

Lime for Agricultural Purposes.

Much interest is taken in the use of lime and limestone on sour soils. The larger portion of our (Kentucky) cultivated soils are either acid or contain only a small amount of carbonate of lime (limestone). For best results on such soils it is necessary to use lime in some form. The nitrogen-gathering plants do not grow well on acid soils; hence it is difficult to keep up the nitrogen supply of the soil under such conditions. The organisms which render the nitrogen of the soil available do not work well in the absence of the carbonate of lime; hence the non-nitrogen gathering plants do not make their best growth. There is an almost universal opinion that soils derived from limestone rock contain sufficient carbonate of lime. This is not true. Such soils are very apt to be deficient in limestone because the rains dissolve it out. The purer the limestone the more readily it is dissolved. Caves and sinkholes of limestone regions are due to water dissolving away the rock. Raw ground limestone is the best material to use. Burnt lime corrects sourness, but it is also a powerful soil stimulant and causes a rapid loss of the organic matter and nitrogen of the soil. The best test to determine whether limestone is needed is to prepare two plots of equal size and seed to clover or alfalfa, using ground limestone on one at the rate of 4 or 5 tons per acre and weighing the yields of hay. The use of limestone on the experiment station farm increased the yield of alfalfa hay from 2,060lbs. per acre to 3,640lbs. per acre the first cutting. Ground limestone should be applied at the rate of 3 or 4 tons per acre in the beginning and 1 ton per acre every four or five years thereafter. It is best to apply it after the ground is broken and thoroughly disk or harrow it in. If burnt lime is used, about half this amount of the freshly burnt material should be applied, but it should be thoroughly slaked before application. Under no circumstances would we recommend burnt lime if the ground limestone can be obtained. Where there is a good demand for ground limestone it is usually delivered on cars at plant for a dollar or less per ton in carload lots in bulk.—Kentucky Experiment Station.

Calf-Rearing Experiments.

An experiment has been carried out at the Woburn Farm on the best way of rearing calves from birth—so (says the *Agricultural Gazette*) it was reported at the last meeting of the Council of the R.A.S.E. Twenty calves were purchased in the market when two to three days old, and were all fed alike for three weeks on whole milk only. After the first three weeks the calves were divided into five lots of four each. To one lot whole milk continued to be given alone, but in the other cases changes of diet were made, separated milk gradually replacing whole milk, and various additions being given to

make up for the fat of the whole milk. Thus, in one lot, cod liver oil was used with the separated milk, in another case a purchased "calf-meal" was employed, in a third case a gruel of linseed and oatmeal was made up, and in a fourth case crushed oats were used in addition to separated milk. The crushed oats, it should be said, were given dry, and not mixed up with the separated milk. A handful at a time was given at first to each calf, and this gradually increased. The calves were thus fed for nine weeks, and, at the conclusion of the three months' feeding, were weighed, when the greatest gain was found to have been obtained from the oats and separated milk, and this at the lowest cost per pound of gain. The following table shows the comparative results :—

Description of Food.	Average Cost per Calf per Week.		Average Gain in lb. per Calf per Week.		Average Cost in Pence per lb. Gain.	
	s.	d.	lb.	d.	lb.	d.
1. Cod liver oil	2	8-19	..	9-66	..	3-33
2. Calf meal	2	0	..	8-66	..	2-77
3. Gruel	2	4-77	..	8-29	..	3-47
4. Crushed oats	2	8-16	..	13-30	..	2-41
5. Whole milk	5	9-22	..	12-83	..	5-39

The calves were then (June 18th) turned out to grass, and from this time were all fed alike—on linseed with a little crushed oats and hay. On September 17th, after an interval of 91 days, they were all again weighed, and the following table gives the comparative gains over this further period :—

	Average Daily Grain per Head. lb.
1. Cod liver oil lot	1-90
2. Calf meal lot	1-75
3. Gruel lot	1-57
4. Whole milk lot	2-00
5. Crushed oats lot	2-19

Thus, it will be seen that not only did the crushed oats with separated milk produce in the first period of experimental feeding the greatest gain at the lowest cost, but, later on, when the special foods were dropped and the calves were all turned out to grass and fed alike, the superiority of the earlier feeding with crushed oats was maintained. The experiment will be carried on for some months longer.

The Sunflower and Commerce.

In the December issue of *The Empire Magazine* Mr. O. Paul Monckton deals with the commercial possibilities of the sunflower, the seeds of which can apparently be used for a variety of purposes which the average man would never dream of. "We can safely say," says Mr. Monckton, "that the sunflower, as a crop, can be successfully grown over wide areas and under

very different climatic conditions ; and that as a crop it is one which makes a certain demand upon the fertility of the land. Again, that while it is possible to extract the oil and use it for salads and feed the resulting cake to horses and cattle—noting, incidentally, that the cakes make a very good ‘ condition powder ’ for stock—it will probably be found easier to use the seed as a poultry food for the fattening of all kinds of farmyard birds for the market. I should be very glad to hear from any readers who have tried, or who would wish to try, the growing of sunflowers on a small scale as an addition to their ordinary farming operations, and to keep in communication with them while their crops are maturing. In this way it will be possible to collect information of the exact effect of different kinds of treatment on the final growth, and to find out whether sunflower-growing on a large scale for poultry food would be likely to give any satisfactory commercial result.”

Russia's Corn Crop.

The official estimate of Russia's crops in the current season, as compiled in Beerbohm's List, is as follows, in quarters :—Wheat, 90,595,000 ; rye, 121,425,000 ; oats, 112,000,000 ; barley, 55,521,000 ; maize, 9,300,000. All but maize are much greater crops than those of 1911.

Variety Balances the Ration.

The feeding of dairy cattle is a fertile field for scientific study. Every advance from the scientific viewpoint receives recognition at once. Much work has been done in determining the best feeds for milk producers ; a mass of evidence has been accumulated. It is this work which enables the dairy industry to forge ahead with such remarkable rapidity. But amid all the mass of data some dairymen are liable to become confused and even to forsake the right road altogether. Between balanced rations and proper fat content, percentage of roughage and amount of concentrate, a time comes when there is woeful indecision as to just the proper method. Yet the entire matter simmers down to a simple question of variety—a variety of grains and roughages. Give the cow enough to eat of enough different grains, after an allowance of a maximum of various roughages, with silage as the most important because the cheapest, and the ration is automatically balanced, the feed problem for most economical production automatically solved. Common-sense variety is the secret of the feeding success of some of our most famous dairymen, many of whom did not know the meaning of a nutritive ratio. Scientific dairy cow feeding is merely an elaboration of the common-sense variety-of-feeds idea. Both are available for our use, and using both gives yet more variety.—*The Breeder's Gazette*.

Dead and Live Weight.

It is evident (says the *Agricultural Gazette*) that the more fat there is in an animal when killed the higher is the percentage of dead to live weight. A butcher will thus get a heavier carcass in proportion to live weight, and if he buys direct from the grazier, who generally under-estimates the weight of the carcass, the former (with his better judgment) will probably get distinctly the better of the deal. If, however, the carcass is sold by weight—so much per stone or pound—the grazier will also be benefited by the transaction, and equally so if he has succeeded in getting the full weight value.

Color in Horses.

Color in horses can be divided into three groups, says Mr. Walter Winans, the yellow, red, and grey groups; and the groups of yellow and red can continue at either end of their scale into the grey group. The yellow group consists of—Cream, dun, mealy-chestnut, golden-chestnut, copper-chestnut, dark-chestnut, black-chestnut. Red group—Mealy-bay, light-bay, blood-bay, light-brown, brown, black with tan muzzle, black-brown. Grey group—White, flea-bitten-grey, dapple-grey, mouse-color, iron-grey, blue-roan, black. The yellow group, when mixed with the grey, has chestnut-roan, skewbald, and dark-chestnut with white mane and tail. The red, when mixed with the grey group, has roan and skewbald. The grey, when its two end colors are mixed, has piebald. In judging a pair at a show, I would give preference to a pair which matched in everything but color over a pair which matched perfectly in color but not in conformation or action. A cross-matched pair look best if their colors are a great contrast; therefore a horse of the yellow group does not go well with one of the red group, but does with the extreme ends of its own scale—a cream with a dark-chestnut looks well. Also reversal of colors of various parts looks well; as a dun horse with a dark-chestnut mane and tail makes a good cross-match to a dark-chestnut with dun mane and tail. A bay and a chestnut both of the same depth of color look very bad as a pair, or the same color looks bad when one is a shade lighter than the other. Almost any horse of the yellow group goes well with one of the grey group if chosen by contrast; a copper-chestnut goes well with either a white, grey, or black. But the red group look bad in a cross-match, either with the yellow or grey groups, or among themselves.—*Live Stock Journal*.

Imports and Exports of Fruits and Plants.

During the month of December 13,379bush. of fresh fruits, 2,829 bags of potatoes, 2pkgs. of plants, 4pkgs. of bulbs, 50pkgs. of vegetables, and 16 tree ferns were examined and admitted at Adelaide and Port Adelaide under

the Vine, Fruit, and Vegetable Protection Act of 1885; 112bush. of over-ripe bananas were rejected. Under the Federal Commerce Act, 200 cases of fresh fruits, 2,532pkgs. of dried fruits, 93pkgs. of preserved fruit, 200pkgs. of honey, and 1pkg. of seeds were exported to oversea markets during the same period. These were distributed as follows:—For London, 887pkgs. of dried fruit; for Germany, 200pkgs. honey; for Vancouver, 1,620pkgs. dried fruit; for New Zealand, 25pkgs. dried fruit and 200pkgs. of fresh fruit; for India and the East, 93pkgs. of preserved fruit and 1pkg. of seeds. Under the Federal Quarantine Act, 1,530pkgs. of plants, bulbs, seeds, &c., were examined and introduced from oversea markets. During the month of January, 1913, 11,041bush. of fresh fruits, 293 bags of potatoes, 360 bunches of bananas, 10pkgs. of cocoanuts, and 2pkgs. of plants were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 188bush. of bananas (over-ripe), and 1bush. of peaches were destroyed. Under the Federal Commerce Act, 178 cases of fresh fruits, 30pkgs. of preserved fruit, and 150pkgs. of honey were exported to oversea markets during the same period. These were distributed as follows:—For London, 150pkgs. honey; for India and the East, 178pkgs. fresh fruits and 30pkgs. of preserved fruit. Under the Federal Quarantine Act, 1,944pkgs. of plants, bulbs, seeds, nuts, etc., were examined and introduced from oversea markets.



INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

FALLING ORANGES.

"P.C." writes—Could you advise us the cause of young oranges dropping? We have about 60 young trees planted five years, very vigorous, the foliage at present being perfect, they were mulched early in the season with fresh horse manure, and have since been periodically watered, the ground being kept always damp. The setting was most prolific, the fruit a healthy-looking green, the growth has been continuous to the size of large marbles, but within a few days nearly the whole of the setting has dropped.

Reply—From your description, your trees possess all of the conditions of the soil which usually are considered to make for a good cropping, and it is quite possible, when the season is farther advanced, they will still carry a fair crop of fruit in spite of the apparently wholesale dropping. The shedding of the young fruits of the orange tree is certainly a subject for further investigation, as it is possible some essential, such as potash or phosphoric acid, may not be available in the soil, or lacking of pollination of the flowers, or the peculiarities of the climate may individually or collectively influence the holding of the fruits. It must be frankly admitted, up to the present, no exact and absolute knowledge on the subject has been evolved.

STOCK INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

Influenza.

The Port Elliot Agricultural Bureau writes that several farmers in that neighborhood have two-year-old horses and foals suffering from mattery discharge from the eyes, the animals are dull and listless, fall off rapidly in condition, and lose flesh; recovery is slow.

Reply—The disease is a form of influenza similar to bastard strangles. Treatment should include plenty of easily digested and nourishing food, and, if the paddocks are much exposed, some form of temporary shelter at night. The most satisfactory drug to use is iodide of arsenic, trituration 3; the dose is 20grs., or as much as will lie on a sixpence, to be put on the tongue once or twice a day. Or, if this is not obtainable, veterinary tincture of arsenicum, 10 drops on the tongue two or three times a day. As a preventive, flowers of sulphur $\frac{1}{2}$ oz. in food once a day for a fortnight or so.

Dry Bible.

“A.B.,” Yallunda, asks for preventive measures and cure for dry bible.

Reply—An effective preventive for dry bible is a lick of equal parts of sweet bonemeal and salt with 1lb. of powdered sulphate of iron to 20 of the mixture. Cattle will generally take it freely, but if they do not, a small handful may be put in the mouth or given as a drench in gruel. Veterinary tincture of bryonia in 20-drop doses every few hours is spoken well of by some as treatment. It is probably well to alternate it with similar doses of tincture nux vomica, always given with as little water as possible. A quart of yeast or 2lbs. of currants often produces a good effect, as do large quantities of warm water passed down the throat by a piece of hose pipe, which the animal is allowed to partly swallow. As prevention is much more satisfactory than treatment, *use the lick and vary the feed* as much as possible, giving especially bran and some form of greenfeed, even if it is only pumpkin, and a dose of yeast now and again, or a quart of beer will help to ward off an attack.

Sore Shoulders.

“Curramulka” asks for a cure for sore shoulders.

Reply—A cheap and effectual cure for sore shoulders is a mixture of white lead and neatsfoot oil as thick as cream applied to the collar and shoulders before and after work; sometimes an ounce of tincture of arnica to a pint of the mixture does good. Loss of condition is a frequent cause, and must be guarded against. Leather lining for the collars is better than check. A metal collar or a strip of zinc round the ordinary one at the point of draught is of advantage. Change the draught frequently, so as to avoid constant pressure on one spot, and, if necessary, chamber or hollow out the collar. Beat all sweat out of collars and put on dry. Let them fit well. Bran-bag false collars are useful. If undue friction on the sore is avoided the horse is, as a rule, better at work.

Effect of a Navel Trouble.

“G.B.S.,” Nott’s Well, states that two months ago he bought a mare and foal, the latter being lame, said to have been trodden on; it was a month old, it was left in a swamp, and three weeks later the damaged hock was found

to have swollen considerably and discharged matter, which was still running. With neatsfoot oil, boracic acid, and sulphur it healed well, but perhaps too quickly, so only oil was used later. Now the swelling has again increased, but is not painful, apparently.

Reply—The history of this case and the symptoms lead one to infer that it is a case of pyæmic omphalo phlebitis, or navel ill, which very frequently is not observed in the navel at all, but in a joint such as this. The best drug to use is an expensive one, Parke, Davis, & Co.'s acetozone. The sore should be well syringed out with 20 grains of this dissolved in a pint of warm water once or twice a day till the discharge ceases; then it should be dusted once a day with a mixture made of one part of acetozone and 10 parts boracic acid. A daily dose of five drops of veterinary tincture of arsenicum will also help. The disease is transmitted from the mare, who should also have a bearing syringed out with the same lotion at monthly intervals.



“Blue Ribbon of Turretfield.”

ROSEWORTHY AGRICULTURAL COLLEGE HARVEST REPORT, 1912-13.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College.

THE WEATHER IN 1912.

The season we have just been through has in every respect proved a most remarkable one. So far as this district is concerned, paradoxical though it may sound, 1912 just missed being both the worst and the best season in our experience. How this came to be will be brought out in an analysis of the rainfall for the year, details concerning which are shown below in Table I.

TABLE I.—*Showing the 1912 Monthly Rainfall on the Roseworthy Agricultural College Farm comparatively with the Means of the Preceding 29 Years.*

Months.	1912.	Means of Preceding 29 Years.	Months.	1912.	Means of Preceding 29 Years.
	Inches.	Inches.		Inches.	Inches.
January	0.09 ..	0.89	August	3.19 ..	2.06
February	0.21 ..	0.51	September	2.43 ..	1.73
March	0.70 ..	0.88	October	0.94 ..	1.66
April	0.91 ..	1.77	November	1.84 ..	1.01
May	0.19 ..	1.85	December	0.92 ..	0.78
June	1.68 ..	2.69			
July	1.87 ..	1.91	Yearly total ..	14.97 ..	17.71

"USEFUL" RAIN.

Thus, then, the rainfall for the season closed down about 2½ in. below our normal average. A statement of this kind, however, conveys little to the mind beyond the fact that we were apparently short of rain during the course of the past season. In previous reports I have endeavored to show that where the cereals are concerned only portion of this total rainfall is of immediate value; and that the favorableness or otherwise of the season is very largely connected with the ratio which this "useful" rain bears to the total fall. In this district "useful" rain in this sense may be said to fall between the beginning of April and the end of November; and even then, in the great majority of cases, rain before the 15th of April and after the 15th of November, may be said to be without value. If now, we take this "useful" rainfall alone into consideration we shall see that 1912 shows up to much greater advantage than would be inferred by a mere inspection of the total for the whole year. The mean "useful" rainfall for the district is represented by 14.68 in.; in 1912 it attained to 13.05 in., i.e., a little over

1½ in. below the normal figure. Compare this with 1911, when the total rainfall was 5½ in. below the average figure, and the "useful" rainfall over 6½ in. below it.

DISTRIBUTION OF "USEFUL" RAIN.

Much, too, depends on the relative distribution of this "useful" rain; and, indeed, it is mainly in the distribution of the latter that the late season proved so peculiar. I append below in Table II. this distribution on the lines adopted in previous reports.

TABLE II.—*Distribution of "Useful" Rain in 1912 comparatively with the Means of the Preceding 29 Years.*

Periods.	1912.	Means of Preceding 29 Years.
	Inches.	Inches.
Seeding rains (April-May)	1.10 ..	3.62
Winter rains (June-July)	3.55 ..	4.60
Spring rains (August-October)	6.56 ..	5.45
Early summer rain (November)	1.84 ..	1.01
Total "useful" rain	13.05 ..	14.68

SEEDING RAINS.

It will be seen, therefore, that seeding rains were abnormally low in 1912; indeed they may be said to have failed us almost entirely. In this district, in ordinary circumstances, seeding operations are not set going until somewhere near the middle of April, and are generally completed by the first week in June; and it is only accidentally that a small proportion of the area seeded is ever sown under dry conditions of soil. In 1912 the total rain registered on the College Farm between the 15th of April and the 9th of June was represented by 45 points distributed over nine days, with a maximum fall of 13 points in one day. And it follows that we were given the wholly abnormal precedent of seeing the great bulk of the district, in which were included all the College fields, sown dry. Worse, however, was to follow. No rain sufficiently heavy to bring about the germination of seed sown as far back as the middle of April reached us until the 24th, 25th, and 26th of June, when we were vouchsafed an inch of rain scattered over three days. By this time the ground had lost its autumnal warmth, and it was well over three weeks later that we were able to decide whether or not the long buried seed had malted badly; and it was then too late to sow again unsatisfactory patches.

Thus it may be stated that the season opened exceedingly gloomily, so much so, indeed, that at one time I thought it quite likely that there would be no crops to gather in at harvest time. Eventually, slowly and painfully, the crops began to show above ground, and, it is true, at harvest time turned out quite beyond our expectations. Throughout the season, however, they

have labored under three disabilities connected originally with the abnormal seeding weather which has been indicated.

(1) In the first place crops that should have shown above ground towards the middle of May did not give any sign of their existence until the middle of July. Now, two months cut away from the normal growing period of plants represents a very serious handicap to healthy growth and normal yields. Eventually this hastened growth proved more or less fatal to oats, the growth of which was generally unsatisfactory and yield poor. Late varieties of wheat suffered almost to an equal degree; whilst, owing very largely to the unusual propitiousness of the latter end of the season, barley and early and midseason wheats suffered hardly at all.

(2) Although seeding rains were not sufficiently heavy to bring about the germination of sown grain, the drizzly showers that fell in early May were in some cases responsible for a good deal of malting, particularly in the lighter types of soil. It follows, therefore, that many a crop sown in the earlier part of the season was found to be very thin when eventually it showed above ground in mid-July. It has already been pointed out that in this district mid-July is altogether too late in the year for a second seeding; hence the thin malted crops had to take their chance, and were very much handicapped in their growth by the competition of rank weeds.

(3) Since the crops were sown in dry conditions of soil, no opportunity presented itself for getting a good germination of weeds before seeding operations; hence, as might have been anticipated, weeds germinated simultaneously with the sown crops, and throughout the season waged war for the possession of the soil. And although in the end, with the exception of thin malted patches, the crops succeeded in getting the upper hand, it was not without a certain amount of bruising, which at harvest time was perceptible in somewhat reduced yields.

WINTER RAINS.

After a shortage of seeding rains abundant winter rains—June-July—would certainly have helped to improve matters. Unfortunately such was not to be the case, and the 1912 winter rains were a full inch below the normal mean of 29 years. The normal amount of rain falling over the first seven months of the year is represented on the College Farm by 10½in. exactly. In 1912, by the end of July, we had registered only 5.65in., that is to say, barely more than one-half of the normal fall.

SPRING RAINS.

It was in the spring of the year that the silver lining in the cloud began to become manifest. August and September rains were so unexpectedly copious that had October followed suit, notwithstanding a disastrous opening, 1912 would have bid fair to have been one of the finest seasons the district has ever experienced. The recovery and subsequent growth of the stunted

crops during these first two months was little short of marvellous. Unfortunately, between the 8th and the 31st of October they received a serious setback. Throughout this period the weather was hot and dry, and blazing north winds of frequent occurrence. The crops that suffered most were the late wheats. The ears of these varieties were as yet enclosed within the accompanying leaf-sheath; and in many cases fully half the ears were scorched off, whilst all were more or less seriously tipped. By this time, however, the early wheats were practically safe, whilst the mid-season varieties still hung in the balance. The condition of oats, like that of the late wheats, was pitiable in the extreme.

EARLY SUMMER RAINS.

November rains are frequently of little or no value to the district; they are always too late for hay crops and, should they come towards the latter half of the month, they do little more than hamper harvesting operations. Fortunately, after our trying October experiences, close on 1in. of rain fell on the 2nd and 3rd of November; and later on these rains were followed up by three-quarters of an inch between the 15th and the 20th of the month. In addition to providential rains, the general weather conditions in November were mild and pleasant, affording quite ideal conditions for the ripening off of the corn crops. Eventually all crops ripened off well, yielding a fine, heavy plump sample of grain, with the exception of a few late varieties that had been irreparably injured by untoward October weather.

FALLOW RAINS.

There remains to be traced the influence of what may be termed "fallow rains," that is, rains falling between the 1st of August, 1911, and the 31st of March, 1912. In this connection the mean fall of rain of 29 years over a similar period of time is represented by 9·52in. of rain. In the season under consideration, however, it attained only to 5·89in., that is to say, a little over one-half of the normal fall. If, therefore, any benefit accrues to us from rain falling in the immediately preceding season and accumulating in our fallow land, relatively to more normal years, we were at a distinct disadvantage in 1912.

The most serious inconvenience, however, connected with this shortage of fallow rains was the fact that the 1911 spring and early summer fall was altogether insufficient to bring about an adequate germination of weeds on fallow land. Hence, when we take into consideration the fact that ultimately circumstances compelled us to sow all our fields under dry conditions of soil, no more effective preparation for dirty crops could possibly have been given. And in the circumstances it argues much for the extraordinary propitiousness of the 1912 spring and early summer that eventually, as will be shown in the sequel, the bulk of our crops were able to triumph over all these difficulties.

ENSILAGE CROPS.

In ideal, and even in ordinary seasons, our ensilage crops have always been drawn from the most forward and rankest of our cereal hay crops ; crops that had germinated early and were ripe for the pits late in September or early in the following month. And very adequate to the purpose had they hitherto proved. In 1906 we cut out close on 12 tons of green stuff to the acre ; in 1909, over 10 tons ; and in a period of seven years (1905-11), an average of 8 tons 3cwt. 23lbs. to the acre. And now, in a period of eight years (1905-12), when the appointed time for ensilage-making came to hand, it remained for 1912 to play us false in the matter of ensilage crops. The seed of our first sown hay crops had, indeed, been scattered early enough ; but early germination is inseparable from early rain ; and the latter having failed us, there were no hay crops sufficiently advanced and sufficiently rank to find favor for ensilage-making in October, 1912. In the circumstances, to have delayed operations would, in all probability, have meant that we should in the end have had on our hands both ensilage and hay making at one and the same time. This was not a risk to be lightly incurred ; and since at the time we were fortunate enough to possess fairly well grown crops of pease, I decided that they should be converted into ensilage, leaving it to ragged patches in our various cereal crops to make good what space might be left unfilled in the pits.

The field under pease is the one known as No. 7b. The pea crop represented the fifth consecutive crop that this field had carried since 1908 ; and in a period of 16 years this field has only once been treated as bare fallow. The past history of the field is summarised below—1897, pasture ; 1898, wheat ; 1899, pasture ; 1900, oats ; 1901, pasture ; 1902, oats ; 1903, pasture ; 1904, bare fallow ; 1905, wheat and oats ; 1906, crimson clover ; 1907, pasture ; 1908, maize and sorghum ; 1909, barley ; 1910, maize and sorghum ; 1911, wheat and oats ; 1912, pease.

The 1911 cereal stubbles were broken up in March and worked down to a fine condition of tilth. On June 13-14, Early Dun pease were drilled in at the rate of 100lbs. of seed to the acre with 1cwt. of superphosphate. My original plan was that this field should be grazed by sheep. Circumstances, however, already indicated led to its being cut out for ensilage towards the 18th of October. At this time the pease were both well grown and well podded.

The difficulty which invariably confronts anybody undertaking to harvest a crop of pease, whether for grain or for green forage, is how to handle the crop to best advantage. No doubt, in the green state, a crop of pease will cut out readily enough with the scythe ; but on a large scale, and where expedition of work was of consequence, this was not a harvesting method that could appeal to us. Hence we tried in succession an ordinary grass-mower, a binder, and finally and definitely an old side-delivery mower.

Harvesting results secured in this way were very far from perfect. I suppose that fully half the crop was left in the field. There was no waste, however, since at a later date what was left afforded excellent grazing to a flock of backward weaned lambs. Ultimately the yield per acre of green stuff actually gathered and chaffed into the pits was exceedingly low when compared with our usual ensilage crop yields. About 24 acres of pease yielded only 3 tons 4cwts. 22lbs. of green stuff to the acre. That this low yield is at all events partly attributable to the method of harvesting adopted is shown by the fact that in 1909 we cut out with the scythe a crop of pease, not much better in appearance, which averaged out 9 tons 11cwts. 46lbs. to the acre.

Not only was the pea crop difficult to cut and tedious to cart, but it also proved very difficult to chaff into the pits; hence, on the whole, the 1912 ensilage-making proved a very slow and laborious process, and will probably in future years lead us to look for some means of escape when pease appear to be the only crop available for ensilage purposes. The ensilage pits have not yet been opened; and without any previous experience in the matter we can form no anticipations as to the probable quality of pea ensilage. It may be stated that the chaffed green pea crop packed down very tightly into the pits, and that relatively to ordinary cereal ensilage the weight of pease chaffed into individual pits was very considerable.

The balance of the ensilage needed by us, viz., about 64 tons of green stuff, was made up with lucerne and ragged, illgrown patches taken from various fields of wheat and barley. The total area cut out for ensilage was ultimately 40·7 acres, which yielded a general average of 3 tons 9cwts. 45lbs. I append below in Table III. the average yields of ensilage crops in preceding years.

TABLE III.—*Showing Average Yields of Ensilage Crops, 1905-12.*

Season.	Rainfall.			Yields per Acre. Tons cwts. lbs.		
	" Useful." Inches.	Total. Inches.				
1905	14·23	16·71	..	8	10	0
1906	16·30	19·72	..	11	18	0
1907	13·81	15·06	..	5	7	34
1908	15·53	17·74	..	7	12	44
1909	21·15	23·05	..	10	0	3
1910	16·79	23·87	..	8	15	32
1911	9·46	13·69	..	4	19	47
1912	13·05	14·97	..	3	9	45
Average yield of eight years				7	11	54

HAY CROPS.

Although ultimately the hay crops turned out very fairly in 1912, they lacked throughout the stimulus of an early start, which in this district is in a measure essential to heavy yields. We had about 152 acres under crops specially sown for hay, which returned an average yield of 2 tons 5cwts. 56lbs. to the acre. In the light, however, of our trying experiences in 1912

I did not judge the quantity of hay lying in the field to be the full measure of our requirements in a possibly bad feed season ; hence we set about cutting down another 96 acres from the least promising portions of our wheat crops. As will be seen later on, these later cuts had the effect of very considerably reducing an otherwise satisfactory hay yield.

I shall now deal *seriatim* with each field from which the 1912 hay was derived.

NOTTLE'S B.

The cropping area of this field is a little over 157 acres. Of this area 33.584 acres were under wheaten hay in 1912. The past history of the field is summarised below—1897, purchased and fallowed ; 1898, wheat ; 1899, wheat ; 1900, bare fallow ; 1901, wheat ; 1902, pasture ; 1903, bare fallow ; 1904, wheat ; 1905, bare fallow ; 1906, wheat and barley ; 1907, pasture ; 1908, bare fallow ; 1909, wheat and oats ; 1910, bare fallow ; 1911, wheat, oats, and beans.

It will be noticed, therefore, that the 1912 crop was the second consecutive crop since the 1910 bare fallow ; and it must be admitted that the season was hardly propitious to second crops. In this case the wheaten hay was made to occupy that portion of the field which had carried beans and oats in 1911 ; and in this connection it may be stated here that throughout the season hay sown where there had been beans in 1911 showed to better advantage than the hay that followed oats.

The 1911 cereal stubbles were broken up with the plough and subsequently rolled and scarified in January and February, 1912 ; and later on, towards the end of March, 2cwts. of 36/38 superphosphate to the acre was drilled in over that portion of the field which was to carry the hay crop. On April 30th and May 1st, a mixture of King's Red and King's White, at the rate of 124lbs. to the acre, was broadcasted over this area, and subsequently cultivated and harrowed in. Immediately afterwards 5lbs. of lucerne to the acre was broadcasted and rolled in. The May showers succeeded in bringing about the germination of the lucerne seed, which subsequently perished from want of moisture, and no trace of the plant is to be seen on the hay stubbles to-day. Only a very small portion of the wheat grain malted in this field, and although ultimately the crop was not a very thick one, it made very fair hay for a second crop in an unfavorable season.

The final yield of the field was represented by 1 ton 18cwts. 27lbs. to the acre.

FIELD NO. 6A.

The cropping area of this field is a little under 38 acres, the whole of which was under hay in 1912. The past history of the field is indicated below—1895, oats ; 1896, pease ; 1897, wheat ; 1898, pasture ; 1899, bare fallow ; 1900, wheat ; 1901, pasture ; 1902, bare fallow ; 1903, wheat ; 1904, pasture ; 1905, bare fallow ; 1906, wheat and oats ; 1907, kale and turnips ; 1908, barley ; 1909, bare fallow ; 1910, wheat and barley ; 1911, maize and sorghum.

In this instance, therefore, the hay crop was following a summer crop of maize and sorghum which had been fed down by the dairy herd. The sorghum stubbles were skim-ploughed between February 6th and 12th; the field was rolled on March 15-18; and from March 16th to 19th drilled with 2cwts. of 36/38 superphosphate to the acre.

On April 25th and 26th the bulk of the eastern portion of the field was broadcasted with King's Red at the rate of 150lbs. to the acre; whilst 5 acres were broadcasted with a mixture of 75lbs. of King's Red and 60lbs. of Calcutta oats to the acre. The broadcasted seed was cultivated and harrowed in.

Immediately after the hay seeding operations, 3 acres adjoining the eastern fence were broadcasted with sainfoin at the rate of 15lbs. to the acre, and the balance of the field with sulla (*Hedysarum coronarium*) at the rate of 21lbs. of hulled seed to the acre. These small seeds were rolled and germinated subsequently very evenly. If they are able to weather the late summer heat I have hopes that they will yield very fair grazing next season.

The hay raised in this field was of excellent quality, the 37 acres of which yielded 2 tons 10cwts. 76lbs. to the acre.

FIELD NO. 6D.

The cropping area of this field is slightly under 35 acres. Of this, a little under 29½ acres were under hay. The past history of this field is summarised below—1895, oats; 1896, pease; 1897, wheat; 1898, pasture; 1899, bare fallow; 1900, wheat; 1901, pasture; 1902, bare fallow; 1903, wheat; 1904, pasture; 1905, pasture; 1906, bare fallow; 1907, wheat; 1908, pasture; 1909, pasture; 1910, pasture; 1911, bare fallow.

It will be noted that this is the first crop this field has carried since 1907. In fact it is one of the handy home paddocks generally used for grazing purposes. The field was late fallowed at odd moments between September and December, 1911. It was heavily rolled towards the latter end of March, and immediately afterwards drilled over with 2cwts. of 36/38 superphosphate to the acre.

The hay seed was broadcasted on the 23rd and 24th of April; part of it consisted of a mixture of 64lbs. of Calcutta oats and 88lbs. of Huguenot wheat, and part of 64lbs. of Calcutta oats and 90lbs. of Marshall's No. 3 wheat to the acre, and a third part simply of 120lbs. of King's White. In this field the early sown wheat appears partly to have malted, and ultimately oats formed the great bulk of the hay.

The hay yield in this field was 2 tons 13cwts. 73lbs.

GRAINGER'S C.

The cropping area of this field, exclusive of experimental plots, is about 78½ acres; of this about 45½ acres were in 1912 under hay, portion of which was cut out for ensilage. This field forms portion of a farm purchased for the College in 1909. This field was fallowed during the course of the same

year, was under wheat in 1910, and fallowed again in 1911. The 1911 fallows were broken in September, the land was rolled and cultivated in November, and cultivated again in January. The bulk of the hay area was broadcasted with King's Red at the rate of 123lbs. to the acre on May 16th and 17th, after having been drilled in with 2cwts. of superphosphate in April.

The yield of this field was 2 tons 0cwts. 26lbs.

DAHLITZ.

The bulk of this field was in 1912 under hand plots and special varieties of wheat and oats, and details concerning the past history of the field will be given later on whilst dealing with the latter. It will be sufficient to state here that the field was under pasture in 1910 and fallowed in 1911.

In this field 11½ acres were drilled in with King's Red on May 23rd at the rate of 90lbs. of seed to the acre, and with 2cwts. of 36/38 superphosphate. This area was cut out for hay and yielded 2 tons 8cwts. to the acre.

EDSARY'S A.

The great bulk of this field also was taken up with varieties of wheat and barley. About 7½ acres of King's White were cut out for hay, yielding 2 tons 7cwts. 24lbs. to the acre.

THE ISLAND B.

This was one of the first fields to be sown in 1912. The soil is somewhat light in texture, with the result that much of the seed malting under the influence of May showers. The crops here were very dirty and thin. About 96 acres were cut out here for hay to make up to our maximum possible requirements. The yield was very low, being only about 18cwts. to the acre.

GENERAL AVERAGE HAY YIELD IN 1912.

Ultimately we cut out 432 tons 7cwts. 49lbs. from 248.45 acres, and representing, therefore, a general average of 1 ton 14cwts. 90lbs. to the acre. This yield would have been very much better had it not been for the poor thin crops of the Island. I append below in Table IV. the averages of preceding years.

TABLE IV.—*Showing Average Hay Yields on the College Farm, 1904-12.*

Season.	Rainfall.		Area.	Average Yield per Acre.
	"Useful." Inches.	Total. Inches.		
1904	11.60	14.70	93.0	2 11 22
1905	14.23	16.71	60.3	3 5 67
1906	16.30	19.72	93.0	2 11 90
1907	13.81	15.06	51.0	1 15 108
1908	15.53	17.74	112.8	2 7 5
1909	21.15	23.05	145.3	2 15 68
1910	16.79	23.87	94.9	2 7 31
1911	9.46	13.69	200.1	1 8 6
1912	13.05	14.97	248.4	1 14 90
General average of nine years				2 6 42

RELATION EXISTING BETWEEN QUANTITY OF HAY CUT AND AMOUNT OF BINDER TWINE USED.

The experienced farmer is, no doubt, able to estimate fairly correctly the amount of hay present in his standing crops ; and later on the thickness and the appearance of the rows of stooks furnish him with additional factors which his experience has taught him how to use. Nevertheless, even to the most experienced of us, but particularly to the novice, it is of inestimable advantage, when making provision for the dimensions of a hay stack, or when making the sale of a crop in the stook, to have at hand a more definite factor to confirm the fallibility of one's judgment. In this connection it is the practice of many farmers to keep a careful account of the quantity of twine used in cutting out a field of hay, and to deduce therefrom an estimate of the quantity of hay lying in the field. It occurred to me last year that since on the College Farm every load of hay goes over the weighbridge before passing into the haystack, it would be an easy matter for us to determine exactly the relationship existing between hay cut and binder twine used. Accordingly, in 1911, we found that in the hay field one ball of twine corresponded, on the average, to 2 tons 6cwts. 65lbs. of hay. Similar records were kept in 1912, and the results secured are indicated below in Table V.

TABLE V.—*Showing the Relation Found to Exist Between the Amount of Hay Cut and Binder Twine Used in Various 1912 Hay Crops.*

Area Cut.	Yield of Hay per Acre.			Character of Hay.	No. of Balls Used.	Quantity of Hay Cut Corre- sponding to one Ball of Twine.		
						Tons	cwts.	lbs.
33-584	1	18	27	Fair hay ; rather short in parts ; undergrowth heavy	36½	1	15	20
33-097	2	11	7	Good hay ; fair height ; clean bottom	34	2	9	78
25-482	2	13	73	Good hay, chiefly oaten ; under- growth fairly thick in parts	35½	1	18	57
37-347	2	0	26	Moderately good hay, of varying height ; fairly clean bottom	33	2	5	60
11-459	2	8	0	Good tall hay ; clean bottom ..	13½	2	0	83
96-254	0	17	111	Poor hay ; short and dirty	48	1	15	100
237-223	—			Season's average	—	2	0	54

Thus then it will be seen that in 1912 the hay crop, which included a large area of short, dirty hay, cut out at 54lbs. over the 2 tons, a figure which I am given to understand many farmers are inclined to take as a fair average, taking one season with another. It should be noted, however, that where the hay is tall and well grown and tolerably free from weeds and undergrowth, the ball of twine is more likely to correspond to 2½ tons than to 2 tons.

BARLEY CROPS.

In 1912 our barley crops were sown on both fallow and stubble land, and, as might have been anticipated in a season of the kind, the crops on fallow showed up much to advantage. There is one feature common to all the crops to which attention should be drawn here: the November rains, coming as they did just as the barley crops were ripening off, had the effect of rendering the straw exceedingly brittle. The result of this was that at harvest time the path of the binders was strewn with barley heads, and on a low estimate I think that we left fully 3bush. to 4bush. to the acre in the field. This barley is not, of course, wholly lost to us, since in the course of time it is readily picked up by grazing livestock; it is, however, lost to our yields, which eventually turned out much lower than we had originally anticipated from field estimates.

THE ISLAND A.

The past history of this field is summarised below—1897, purchased and fallowed; 1898, wheat; 1899, pasture; 1900, bare fallow; 1901, wheat and oats; 1902, bare fallow; 1903, wheat and oats; 1904, pasture; 1905, bare fallow; 1906, wheat, barley, and pease; 1907, bare fallow; 1908, wheat and oats; 1909, rape; 1910, barley; 1911, bare fallow; 1912, barley.

On March 11-13 about 145lbs. of 36/38 superphosphate were drilled in to the acre; and on April 19-20 Short Head barley of the 4th selection was broadcasted at the rate of 100lbs. of seed to the acre; the seed was subsequently cultivated in. On April 22nd the field was broadcasted over with sulphate of potash at the rate of $\frac{1}{2}$ cwt. to the acre, and subsequently harrowed. The soil of this field is light and sandy, and past experience has taught us that soil of this kind always responds well to potassic manures.

The area under barley in this field was a fraction over 35 acres, and the yield was ultimately 36bush. 19lbs. to the acre, although as a standing crop it looked good enough for 40bush.

EBSARY'S A.

The total cropping area of this field is 54.206 acres; of this area only 8.771 acres were under barley, the balance, for the most part, being under various varieties of wheat. I shall reserve, therefore, data bearing on the past history of this field for a later section of this report. It will be sufficient to state here that after three successive years of pasture the field was fallowed in 1911.

The barleys sown in this field were from seed immediately derived from the 1911 hand selection plots. They represented, therefore, our latest selec-

tions from which will be taken the general farm seed for 1913. Full seeding and harvesting details concerning these barleys are shown below in Table VI.

TABLE VI.—*Showing Harvest Results of Highest Selection Barleys in Ebsary's A.*

Variety.	Selection.	Area. Acres.	Date Sown.	Yield per Acre.	
				Bush.	lbs.
Short Head	6th	3·679	May 30th	41	48
Square Head.....	7th	2·758	May 31st	33	49
Roseworthy Oregon..	5th	2·334	May 31st	40	22
Field average ..	—	8·771	—	39	1

It will be noted that, relatively to the other two varieties, the yield of Square Head barley is again unsatisfactory. This variety, which is always extremely handsome as a standing crop, does not appear to be able, under our climatic conditions, to ripen off its grain into a fine, plump sample; it is generally more or less pinched and thin, much to the detriment of the yield. We have now been carefully selecting and growing this variety for eight years. At one time it appeared to us exceedingly promising; a more extended experience of it, however, has led to the reluctant determination to set it aside altogether.

It should be stated here that not one of the three varieties of barley grown in Ebsary's A eventually yielded at harvest time up to standing crop expectations. The reason of this appears to me to be the excessive rankness of barley crops grown on fallow land in rather high agricultural condition. The usual result in such cases—and it was the result here—is a rather thin, blighted grain which weighs very light.

DAHLITZ.

The great bulk of this field, the cropping area of which is 44·365 acres, was under special varieties of wheats and hand plots. The area under barley was only 2·459 acres, placed there as a protection to the hand plots against birds. In the matter of the past history of this field I will, therefore, merely state that it was fallowed in 1911, after lying out as pasture in 1910.

The barley sown here was Roseworthy Oregon of the 4th selection, and the yield 43bush. 22lbs.

NOTTLE'S B.

Full details concerning the past history of this field have been given in the earlier portion of this report whilst dealing with the hay crop which occupied portion of this field. It will be sufficient, therefore, to state here that the portion of the field that carried barley in 1912 was under wheat in 1911. The Nottle's barley crop, therefore, 71·635 acres in area, was a second crop, and unfortunately it did not give us the satisfactory yields that we have been accustomed to in the past.

The wheat stubbles were broken up in February and worked down subsequently with rollers and cultivators. Unfortunately, practically no rain

fell on the ploughed ground between the breaking of the fallows and seeding operations. Details concerning seeding and harvesting operations are shown below in Table VII.

TABLE VII.—*Showing Yields of Barley after Wheat in Nottle's B in 1912.*

Variety.	Selection.	Area. Acres.	Date Sown.	Yield per Acre.	
				Bush.	lbs.
Short Head	4th	7.509	May 27th-28th	26	30
Short Head	5th	25.513	May 24th-28th	11	42
Square Head.....	6th	11.178	May 28th-29th	12	45
Roseworthy Oregon.....	3rd	22.513	May 28th-30th	9	2
Roseworthy Oregon.....	4th	4.922	May 29th	11	27
Total field yield				12	33

All the above varieties were drilled in with 2cwts. of 36/38 superphosphate to the acre. The field was rolled in August, as it was rather rough on the surface.

A yield of 12bush. 33lbs. is certainly as unsatisfactory as it was unexpected, and although, as a result of the extreme brittleness of the barley straw, harvesting difficulties in this field were perhaps more pronounced than elsewhere, this fact alone does not suffice to explain the unsatisfactory nature of the yield. This is the fifth season in which we have grown barley as a second crop in succession to wheat, and, as the table below shows, the only season in which the practice has proved more or less unsuccessful.

TABLE VIII.—*Showing the Average Yields of Barley Sown on Wheat Stubbles from 1908 to 1912.*

Season.	Rainfall.		Yield per Acre.	
	"Useful." Total.			
	Inches.	Inches.	Bush.	lbs.
1908	15.53	17.74	28	26
1909	21.15	23.05	23	13
1910	16.79	23.87	40	10
1911	9.46	13.69	44	29
1912	13.05	14.97	12	33

Thus it will be seen that, whilst both "useful" (April-November) and total rainfall were higher in 1912 than in 1911, nevertheless the yield of barley after wheat was 44bush. 29lbs. in 1911 and only 12bush. 33lbs. in 1912. The manifest disadvantage, however, under which the 1912 crops labored throughout was that no soaking rains reached them until the middle of June; hence, as has already been pointed out, stubble land broken up in February received absolutely no rain until long after seeding operations had been completed. Added to this difficulty there was the fact that the portion of Nottle's B that was sown to barley is rather heavy in character and unfortunately overrun with soursobs. In ordinary seasons a well-grown crop of barley can have no difficulty in getting the upper hand of soursobs (*Oxalis cernua*). A poor-grown crop like that of 1912 did not, however, prove equal to the task. That these facts helped to reduce the yield very materially there can be no doubt, since the 7½ acres sown in this field to

Short Head of the 4th selection, which yielded over 26½ bush. to the acre, were placed in the extreme east of the field on a light limestone rise comparatively free from soursofs.

Finally, it has already been stated that, with the object of getting a smooth bottom for the binders, the barley crop was rolled in August. It would probably have been better practice to have placed the harrows behind the rollers; this, however, was not done, and it is probable that rolling alone had the effect of still further stunting the growth of the barley plants in an abnormal and dry season.

BARLEY PLOTS IN THE PERMANENT EXPERIMENT FIELD.

Finally, in the Permanent Experiment Field, there were three plots under barley, of a total acreage of 5.919. Full details concerning these plots is always given in a separate report bearing on the subject. It will be sufficient to state here that the yield of these plots averaged out at 24½ bush. 27lbs.

GENERAL BARLEY AVERAGE YIELD IN 1912.

The general average barley yield for the season remains to be determined. We harvested in 1912 2,775 bush. 10lbs. of barley from 123.82 acres, which gives a general average yield of 22 bush. 21lbs. to the acre. The low character of this average is attributable to the partial failure in Nottle's B already referred to. I append below in Table IX. a summary of the barley yields of recent years.

TABLE IX.—*Showing Average Barley Yields on the College Farm, 1904-12. Rainfall.*

Season.	"Useful."		Total.	Area.		Average	
	Inches.	Inches.				Bush.	lbs.
1904	11-00	14-70		27-86	..	38	33
1905	14-23	16-71	..	65-73	..	25	4
1906	16-30	19-72	..	51-00	..	40	38
1907	13-81	15-05	..	79-30	..	31	21
1908	15-53	17-74	..	94-83	..	43	49
1909	21-15	23-05	..	75-27	..	35	0
1910	16-79	23-87	..	113-42	..	37	9
1911	9-46	13-69	..	76-09	..	39	31
1912	13-05	14-97	..	123-82	..	22	21
Mean of nine years						34	45

OAT CROPS.

The ordinary climatic conditions of the district do not, as a rule, favor the growth of oat crops; hence, except in the way of hay, oat crops are never given a very important position in the College Farm crops. As a rule, we do not seek to raise more oats than will meet our ordinary feeding requirements. Hitherto in our experience the only seasons that prove at all favorable to oats grown for grain are those opening with early and abundant autumn rains; and in unfavorable seasons the failure of oats is all the more pronounced the later the opening of the season. In the circumstances, therefore, 1912 must be described as one of the worst possible seasons for oats.

NOTTLE'S B.

The bulk of oat crops were placed in Nottle's B, the past history of which has been given in detail when dealing with the hay crop which it also carried. It will be sufficient here to recall that the land which carried oats in 1912 had carried wheat in 1911. The oats were, therefore, a second consecutive grain crop, which did not, of course, improve their chances. Full seeding and harvest details are given below in Table X.

TABLE X.—*Showing Harvest Details of Oats Grown in Nottle's B, 1912.*

Variety.	Area Sown. Acres.	Date Sown.	Yield per Acre.	
			Bush.	lbs.
Calcutta oats	9.965	April 16-17	9	29
Algerian oats	14.287	April 17-18	10	37
Cape oats	11.186	April 18-19	16	26
Scotch Grey oats	13.280	April 22-23	2	32

All four varieties were drilled in at the rate of 80lbs. to the acre with 2cwts. of superphosphate. The complete failure of the Scotch Grey oats will be noted. The seed had been imported from New Zealand and, unfortunately, had to face a very unfavorable season before it had time to become acclimatised to local conditions.

DAHLITZ.

In this field which had been treated as bare fallow in the preceding year we had three small plots of oats, which yielded as follows:—Algerian oats (1.225 acres), 16bush. 38lbs.; Scotch Grey oats, of local origin (0.034 acres), 45bush. 24lbs.; and Garton oats (0.057 acres), 12bush. 11lbs.

PERMANENT EXPERIMENT FIELD PLOT.

Finally, one plot in the Permanent Experiment Field was under Algerian oats (1.974 acres), and yielded 25bush. 7lbs. to the acre.

GENERAL OAT AVERAGE YIELD.

From 52 acres we secured 525bush. 16lbs. of oats, which represents a general average of 10bush. 4lbs. to the acre. Below, in Table XI., will be found the average yields of past years.

TABLE XI.—*Showing Average Yields of Oats on the College Farm, 1905-12.*

Season.	Rainfall.		Area. Acres.			Yield per Acre.	
	"Useful." Inches.	Total. Inches.				Bush.	lbs.
1905	14.23	16.71	20.00	..		43	10
1906	16.30	19.72	33.50	..		41	18
1907	13.81	15.05	20.00	..		Complete failure from feeding off.	
1908	15.53	17.74	20.00	..		22	28
1909	21.15	23.05	23.52	..		43	19
1910	16.79	23.87	24.60	..		28	15
1911	9.46	13.69	22.82	..		22	8
1912	13.05	14.97	52.00	..		10	4
Mean of seven years (omitting 1907)						30	9

RYE CROPS.

Every year we have a small area under rye, the varieties used having been imported by me from France in 1908. In 1912 these rye plots were placed on fallow land in Ebsary's A. Details concerning the results secured are shown below in Table XII.

TABLE XII.—*Showing 1912 Yields of Rye Crops in Ebsary's A.*

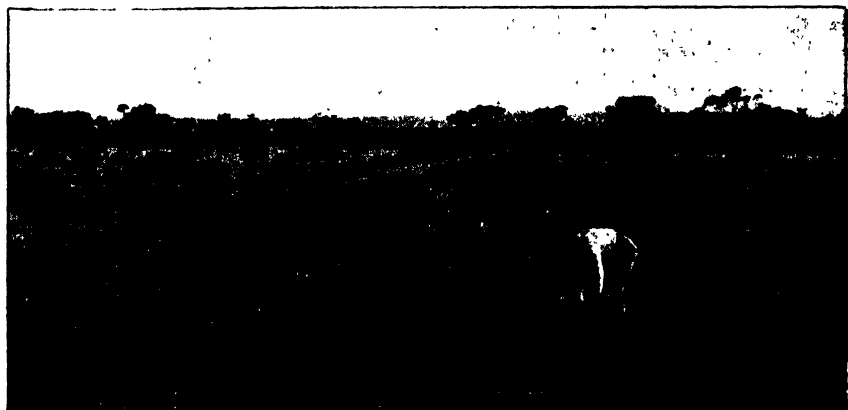
Variety.	Area Sown. Acres.	When Sown.	Yield per Acre.	
			Bush.	lbs.
March rye	0.596	May 31	15	16
Multicaule Rye	0.552	June 1	11	22
Giant Winter rye	0.508	June 1	11	4
Schlanstedt rye	0.464	June 1	10	13

The results of previous years are summarised below in Table XIII.

TABLE XIII.—*Showing General Returns from Ryes, 1909-12.*

Variety.	Yields.				Mean Yield.
	1909.	1910.	1911.	1912.	
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.
March rye	7 46	16 4	20 9	15 16	14 47
Multicaule rye	8 44	12 40	11 24	11 22	11 4
Giant Winter rye	11 34	12 36	9 45	11 4	11 16
Schlanstedt rye	4 3	15 14	9 48	10 13	9 48
Average yields	8 15	14 9	12 43	12 00	11 45

(To be continued.)



STOOKING HAY AT ROSEWORTHY.

FARM ANIMALS.

DISEASES OF THE EYE (HORSE).

By C. A. LOXTON, G.V.M.C., Assistant Government Veterinary Surgeon.

Diseases affecting the eye are of greater importance in the horse than in the other domestic animals. They are frequently a cause of defective vision, which may make him more or less dangerous to use, may be a cause of shying, and often result in partial or complete blindness, render him unsound, and so depreciate his market value. Though this note refers particularly to the horse, it applies also to all classes of stock.

It is unnecessary to describe the structure of the eye, but the following terms require definition :—

Conjunctiva.—A delicate membrane which lines the inner surface of the eyelids, part of the “haw” (*membrana nictitans*), and the whole of the front of the eyeball.

Cornea.—The convex transparent portion of the eye forming the front part of the eyeball.

Membrana Nictitans.—Popularly called the “haw,” winking body, or third eyelid, situated at the inner corner of the eye. Its functions, like the eyelids, are to protect the eye, to remove particles of dust, &c., from the eye.

Aqueous Humor.—A watery fluid which fills the space between the cornea and the lens.

Lens.—A solid, transparent, biconvex body, about half an inch in diameter, which lies behind the iris and focuses the rays of light on the sensitive portion of the eye.

The diseases which require special description are few in number, the most important, as well as the most frequent, being of an inflammatory character.

SIMPLE OPHTHALMIA, OR CONJUNCTIVITIS.

Inflammation of the membrane which covers the front of the eye and lines the eyelids. The inflammation is superficial in character, and may be caused by injuries such as blows of the whip, the presence of foreign bodies in the eye—chaff, dust, &c., or any other irritating material. It may be due to atmospheric influences, *e.g.*, cold. It also occurs in certain other diseases, such as influenza. A specific form is seen in cattle and sheep, which is very contagious.

Symptoms.—There is a profuse discharge of tears (watering of the eye), the eyelids are swollen and kept half closed. The conjunctiva is red; the “haw” protrudes and partially covers the eye; the cornea loses its transparent character and becomes cloudy. When the disease results from injury, usually only one eye will be affected, and the inflammation will be most severe at the seat of injury, which, when on the cornea, will be seen as a white or bluish mark. When due to other causes the cloudiness of the cornea is more or less uniform, or may be greatest at the margin. In a few days the discharge from the eyes loses its watery character and becomes thick and “mattery”; the cornea may become quite opaque, causing temporary blindness. Severe injuries or inflammation may result in ulceration of the cornea and escape of the aqueous humor, but as long as the iris and lens are uninjured, healing will probably take place, leaving a permanent scar.

Treatment.—Horses affected with ophthalmia are best kept in a darkened loosebox on account of the painful effect of strong light on the eye. If one eye only is affected, it can be kept covered with a piece of soft cloth attached to the halter or headstall. The eye should be frequently bathed with warm 2 per cent. boracic solution, or about a dessertspoonful to a pint of water. A little extract of belladonna smeared on the lids helps to relieve the pain. After the inflammation has subsided, an astringent lotion, such as alum, 2 grains to an ounce of water, may be used. A few drops of this solution may be placed in the eye two or three times a day with an eye dropper or a clean feather. When ulceration of the cornea is present, the following lotion is recommended:—Nitrate of silver 3 grains, distilled water 1oz. This may be applied twice daily with a camel-hair brush.

OPACITY OF THE CORNEA.

A thin film always results to a greater or less degree after inflammation of that structure. If the inflammation is not severe it will gradually clear up as the source of irritation disappears, though, where the surface is abraded or ulcerated from the presence of a foreign body, a permanent scar will usually result. Much harm is done by blowing irritating powders into the eye with the object of removing the cloudiness which remains after inflammation. If this does not disappear in a reasonable time, the following lotion may be used:—Sulphate of zinc, 2 grains; distilled water, 1oz. Apply a few drops three times a day with an eye dropper or a clean feather.

FOREIGN BODIES IN THE EYE.

These become lodged on the internal surface of the eyelids, or attached to the surface of the wall of the eye. They are a common cause of conjunctivitis. Their removal is difficult without the use of a local anæsthetic. For this purpose a 4 per cent. solution of cocaine is used, a few drops being placed in the eye with an eye dropper or a camel-hair brush, or a small fragment

of cotton wool may be saturated with the cocaine solution, and placed inside the eyelid. In a few minutes the eye can be examined, and the offending body removed. If discovered early, persistent bathing with boracic lotion is often effectual, but if present any length of time it will become adherent to the eye, and will require a small pair of forceps to remove it. After removal a few drops of castor oil placed in the eye will relieve the irritation; but if the eye is inflamed, treat as directed for conjunctivitis.

INTERNAL OPHTHALMIA.

In this disease the inflammation involves the internal structures of the eye. The disease is a serious one, and often results in permanent loss of sight. The causes are similar to those of simple ophthalmia, only of a more severe character. A recurrent form of this disease is described, but it is rarely seen, and the repeated attacks usually end in blindness.

Symptoms.—These resemble those of simple ophthalmia, but are much greater in degree, and affect more particularly the internal parts of the eye. The extreme sensitiveness to light is very marked. The anterior chamber of the eye becomes filled with turbid fluid. Pus may form within the eye, giving it a dull, yellowish appearance. In this form of ophthalmia there is constitutional disturbance, with fever.

Treatment.—This should be on the same line as that indicated for simple ophthalmia. The patient should be placed in a dark box. Frequent bathing with warm boracic solution helps to allay the pain. Preparations of belladonna are particularly useful in this disease. Constitutional treatment with purgatives followed by tonics is recommended.

AMAUROSIS (Paralysis of the Optic Nerve).

This may be a symptom of disease of the brain or optic nerve. It may also be due to certain vegetable poisons, and is also sometimes seen after excessive loss of blood, such as bleeding after castration. The eye has a peculiar glassy appearance; the pupil does not respond to the action of light, and is abnormally dilated. Blindness is indicated by the cautious gait, the head being elevated and the forelegs lifted unusually high. The quick movements of the ear are also characteristic of blindness. Amaurosis, except when due to loss of blood, is usually incurable.

TUMORS, WARTS, ETC.

The eye or its appendages is frequently the seat of new growths. One of those frequently met with is a malignant tumor growing from the "haw," which if not treated early involves the rest of the eye, and even the bones of the face.

Treatment of this condition consists in early removal with the knife. This should be done by the professional veterinary surgeon. Warts are often found on the eyelids, and if not too large may be snipped off with the scissors.

DIET DEFICIENCY AND DISEASE IN LIVESTOCK.

[Paper read before The Australasian Association for the Advancement of Science, Veterinary Section, by F. E. PLACE, B.Sc., B.V.Sc., M.R.C.V.S., Veterinary Lecturer to the Department of Agriculture, S.A.]

The following paper on "Diet Deficiency and Disease in Livestock" was read before the Veterinary Section of the Australasian Association for the Advancement of Science, at its recent meeting in Melbourne, by Mr. F. E. Place, B.V.Sc., M.R.C.V.S. :—

Some of the phenomena connected with diet deficiency and disease in livestock attracted my attention many years ago during dry summers upon the moors of Devon; but during the Indian famine of 1904-5 I began to collate certain symptoms and to assign to them in my own mind a chemico-physiological importance in the conditions which prevailed among the livestock in the famine-stricken desert of Rajputana. Upon my arrival in Australia, some three years ago, I found in Victoria and South Australia that the minds of stockowners were being exercised over similar if not identical problems, quaintly named in the latter State "dry bible" and "coasting," while Tasmania and New Zealand meet with trouble possibly more akin to the English forms in "midland disease" and "bush sickness," and South Africa joins in with "lam" and "stieffziekte." In the face of all of them the veterinary profession has, unfortunately, to admit its ignorance of the causative factors and has to adopt empirical remedies, such as bonemeal, and to endure a certain amount of scorn from the ignorant and unscientific who know all about it, while the profession is still delving amid the mass of contradictory report and confusing symptoms in an earnest, and I hope soon to be successful, endeavor to elucidate the reason of phenomena noticed.

If I may be allowed I will revert for a few moments to a number of diseases which affect ourselves and which I may refer to as belonging to groups, such as the beri-beri, the scurvy, and the pellagra groups. These are recognised by a large and increasing number of scientists as yielding to suitable diet; and I class myself among the believers that they are caused by deficiency of certain food elements, the absence of which has a marked and serious effect upon tissue metabolism in nerve, muscle, and bone—a group of organs which compose about 60 per cent. of the bodies of our domestic animals, and which hitherto have received more attention from the breeder of livestock than from the veterinary surgeon, if we omit those which build up the legs of a horse.

BERI-BERI AND SCURVY.

For a moment I will briefly sketch the symptoms of beri-beri as I have seen them occurring in some poor wretch who has vainly been endeavoring to keep body and soul together upon a handful of mouldy, weevilly rice. And then I will try and draw a parallel from a horse dying in the Ninety-Mile Desert. The patient loses weight till he is reduced to a skeleton, there is oedema, contractions, paralysis, and anæsthesia of the limbs, marked nervous symptoms, due apparently to degeneration of the peripheral nerves and those of the heart muscle, followed by death or recovery without any treatment beyond a change of locale, with most probably important additions to the defective diet. So much for the human animal; now for the equine. The collar grows too large, fresh holes have to be punched in the girths, the legs swell, and the spur-vein fills, he trips and totters, and without notice collapses on the sand without a groan or struggle, with spume at the nostril and nought but hide upon his ribs.

Or look for a moment at a case of scurvy, with its anæmia and cachexia, its local hæmorrhages and hæmorrhagic inflammation, the spots on the ribs, their dislocation from the cartilages, with perhaps neuritis and anæsthesia of the limbs; and compare it with a coastly heifer with her bloodless eyes and bottled jaw, her gaspy breath, due to her ribs failing to distend, her tottering walk and swollen fetlocks, and, finally, her feeble helpless efforts to control her limbs and raise her wasted carcass.

Is not one justified in asking: Are these mere coincidences, or is there not a closer connection? For my own part I think there is; and it is interesting to note how veterinary surgeons have accepted and rejected the same theories with regard to this class of disease, as have members of the sister profession, though they have worked apart. Intoxication, auto-intoxication, infection, and even the photodynamic theories, like ancient dynasties, have risen, held their sway and gone, while now the deficiency theory has been hinted at by Theiler, Gilruth, and Aston, though but tentatively, and "as through a glass darkly." For to us the proteid has been a mass, a pyramid viewed in the mist of early dawn, and in the noon-day heat its building stones have but afforded us shelter while we slept; their individual characters, their cryptic signs are still to seek, and perhaps "at eventide there shall be light."

The cow with her hide-bound belly and stiff-stretched neck, chewing the bones of some less lucky mate, has suggested the want of phosphorus, and kindly consideration has provided a bonemeal lick. But is not this significant of a certain amount of rough-and-ready argument forced upon the veterinary surgeon by the pressing need of staying the plague; and is it not characteristic of a certain roughness in feeding experiments which have been carried out. We see the proteid, the carbohydrate, and the fat—the tricolor which proclaims the revolution; but we are deaf to the groans the gabelle raises; we think the miller but dips out a negligible mite; we wonder when red ruin racks

our State ; we fail to miss the amides of our meadow hay ; we ignore the subtle ethers which scarce move our chemist's scale, and wonder when our beast falls, never to rise again.

COMPOSITION OF FEED STUFFS.

Led by the chemist, whose accuracy far exceeds our own, we have framed standard diets with correct nitrogenous ratios ; we have carefully balanced the income and the outgoing, at least in theory, and our American cousins have also, in fact, in some careful series of experiments, especially those carried out at Wisconsin, without success. Here in Australia we have no data *re* the composition of our common feed stuffs. We know less about them than we do of the component parts of a German sugar beet or an Indian millet, and our ignorance falls upon our own heads in the nemesis of dry bible and coast. South Australia, at least, is endeavoring to lift the veil of this darkness, but many years must elapse before the observations and experiments now being carried out at the Agricultural College, Roseworthy, can be finalised, though from time to time parts of them may be available. Up to now we have no Australian analysis of cockie chaff, our grasses and native clovers are unknown quantities, but when we seek them out we must remember that caloric figures are incomplete records of the value of a food stuff, and that the innate metabolism of a grain has a physiological value which we cannot weigh or count in figures. In short, that the feeding value of any food is based upon a most complicated chain of factors each dependent upon the other, till the mind becomes dazed at the number of combinations any one series may present.

FEEDING VALUE OF FORAGE.

The appearance of the stock in the dry districts of South Australia leads one to think that a very large amount of feeding value of their forage is expended in maintenance—more than the five-twelfths of Kellner's observations. Even those which are keeping their condition give one the impression that too great a proportion of their energy is expended in managing to live. To use a feeder's expression, they have no "bloom," or in butcher's terms, they "kill light." A somewhat extensive acquaintance with these beasts in the slaughterhouse supports this idea ; their musculature is devoid of inter-muscular fat, and its water content is far too high proportionately ; so they shrivel when they set and resemble biltong more than beef, and when canned their gravy is gelatin rather than jelly.

A high proportion of this class of beast has an acid reaction with the urine, which is also the case in dry bible and in some forms of coast disease, anent which it is interesting to recall the note in Smith's Physiology, "When the herbivora are starved their urine gives an acid reaction." Now, as physiologists, we must look further than the kidneys and bladder for the origin

of this change, and we find it no doubt in the muscles. This is not the place, nor if it were, would time permit to go into detail as to chemical changes in the muscles; but it is worth noting that they become strongly acid in reaction when the call upon their endurance is excessive, either as labor or as deficiency in nutriment. In this connection we must call to mind the fact that food deficient in nutriment not only fails to nourish but also lowers the digestibility of nutritious food fed with it, so that large feeds of straw chaff with a modicum of inferior wheat, such as form the standard diet of many horses, do not conform to the requirements of their system, even when liberally diluted with sand, nor are they calculated to produce meat or milk.

At first glance the analysis of certain straws does not show them to be entirely unsuited for use as food, but wheat straw seldom shines out well, Kellner's figures being—Water 13.6, nitrogenous substances 3.3, fat 1.3, soluble carbohydrates 39.4, fibre 37.1, ash 5.3, with a digestibility of less than a third of its weight. And this is the diet on which a large proportion of Australian stock are supposed to find their nourishment. For an analysis of wheaten hay we have to go to America, and it is by no means improbable that the analyses made there are those of a fodder differing in many effective elements from the same substance here, but it shows a marked improvement in the nutritive ratio and reveals the fact that cockie chaff probably saves the situation. It is to be hoped that the Roseworthy experiments and observations will set this matter more clearly before the feeder.

The careful study of the analyses of the common fodders in use in Australia is of value, but analysis alone is most misleading—digestibility is a better guide. Assimilation, however, is not synonymous even with this, as the appearance of stock on much country, where undoubtedly they are digesting a fair proportion of what they eat, clearly shows, for frequently a change to land which does not seem so good brings about an alteration for the better. When dealing with metabolism in the tissues we are dealing with only a limited series of factors. Metabolism in the fodder itself while growing and after cutting and while in store, to say nothing of the natural action of the enzymes of the digestive juices in partnership with those of the fodder, are all issues which have to be studied, both alone and in conjunction.

In Australasia, livestock present the symptoms of the great groups of deficiency diseases observed in man. The beri-beri group is typified by the so-called opizootic paralysis, and the disease in horses where the collapse is so sudden that death may occur upon a journey without warning and reminds many who went to the war in South Africa of the fatal horse sickness prevalent in that country, whose lamziekte and stiffziekte have their counterparts here in neat stock as coasting and dry bible. The scurvy group appear in horses, cattle, and sheep in forms widely known, but generally receiving local and often unmeaning names, such as crankums, rheumatoid arthritis, and so on. The pellagra group also have their counterparts in skin

and stomach lesions in the central and northern districts of Australia, the midlands of Tasmania, and the north island of New Zealand, a chain of tracts which have in common scarcely any climatic or botanic similarities, which fact almost forces on one the necessity of falling back upon physiological resemblances.

Fagopyrismus in cattle and epizootic paralysis in horses naturally turn the thoughts to the study of the balance of metabolic factors and their influence on the major physiological processes in livestock, because they are instances of the disastrous effect of very slight alterations in those balances. Among physicians one school scoffs at the labored triturations of the other, which in turn smiles in pity upon the germ bespangled broths and jellies of the first, and both in turn are the sport of yet a third party, which, while deriding drugs or sera, agitates the public mind with the desire for frequent change both in venue and diet, to say nothing of habits and thought. Between them nature waves her wand and produces eggs and cream, lamb chops and Murray cod, strawberries and apples, ale and tea, all just proteids, carbohydrates, fats and water, yet every one distinctly different and pleasing in their variety by their distinctive characters, which are to a great extent amides or amido acids, almost negligible from an analyst's point of view, but recognisable by the working bullock that suddenly pulls up to crop some succulent weed by the roadside, or the colt which, browsing by its dam, picks off the dainty tops that please its palate. And even the farmer seeks for them when at this time of year he bemoans the fact that pastures, so good three months ago, are not able to carry the stock now; though, minus water, the crop upon them is probably weight for weight richer in proteids, &c., than it was then.

AN IMPORTANT FACTOR.

And here we must pause a moment to consider an important factor which probably has much to do with deficiency in Australian fodder, namely, the fact that plants grown in dry heat are deficient in many of their natural amides; that when present these undergo metabolic changes which render them unadapted to the use of stock—a fact unpleasantly forced upon my notice some few years ago, in Burma, by the untimely and numerous deaths of ponies fed upon *phaseolus lunatus* and similar legumes grown in a dry district, while lower down in the moister parts the same plants were fed regularly without harm. I have no doubt that the contradictory reports about Soya beans in England arise from the conditions under which they have been grown, in spite of the similarity of the analyses in all such cases.

Recent investigations by the Commonwealth Statistician have demonstrated the curious effect upon the birth and death rate of varying quantities of moisture in the atmosphere as applied to man. The practical farmer daily demonstrates the same thing in his movements of stock, while the creek and the waterhole seem to be the determining factors in the utilisation of the

amides in the fodder illustrated by the saying I heard some 30 years ago in the Riverina, that if the sheep could have a blade of grass one day and a drop of water the next they could weather through the drought, but with the grass alone they would lie down and die.

Research has demonstrated that in the large nerve organs as well as in the peripheral nerves of animals that have starved, or in the polyneuritis of pigeons, and in the impaction paralysis of cattle there is a marked deficiency in the normal phosphorus content of those organs, despite the fact that phosphatic content of their food has been ample. And one knows how very disappointing, from a therapeutic point of view, the administration of phosphorus proves to be in many cases, while in others it seems to act like a charm. A series of analyses of the phosphorus contents, both actual and relative, of the otoliths in paralytic stock would probably illuminate the obscurity of many of the symptoms.

When it is considered that the caloric energy of bad grass hay as compared with good grass hay is very little more than half, and that five-twelfths of the amount of food eaten has to be used for maintenance; that the wastage of bad hay is double that of good, and that the more inferior the fodder is the greater the depression of digestion; also that when in conjunction with these factors they are all intensified if the water supply is insufficient, one is bound to consider that under some Australian conditions livestock must be chronically upon the verge of starvation. This, as a matter of fact, is just the impression that I gained when first studying these conditions, although an absence of 13 years from England and an extensive acquaintance with the appearance of stock in India under famine conditions should have familiarised me with the symptoms of existence under such disadvantages. One notices when phosphorus is available, as when bonemeal is given, that the nerve lesions are minimised, but that the appearances compatible with bloom and health are only restored when natural fodder in an actively growing stage is to be had; unless one makes an exception in the case of stock receiving ensilage, a form of nourishment in which, if the natural amides have undergone change, their place is taken in some degree by ferment products nearly allied to them. In this connection the mind reverts to the empiric remedies of currants and yeast, the administration of which is undoubtedly followed by a measure of success in this class of disease which cannot fairly be attributed to a merely mechanical action upon the ingesta.

One other point must be called to mind before we commence to collate the clinical facts we have been considering, and that is the frequency with which enlargement of the thyroid is met with in the class of disease under consideration. One finds this in all classes of stock—colts, calves, mares, geldings, cows, and steers—a list which excludes those whose generative organs are immature, or male animals which, as a rule, are fed with a diet of superior order.

PROTECTIVE SUBSTANCES.

It may be that from a clinical point of view, I have not brought forward sufficient evidence to convince many that we are dealing with groups of disease resulting from diet deficiency—that is, deficiency in some essential necessary for the normal physiological processes, diseases that may still be regarded by many as intoxications—a view I must confess I still have a hankering after, although my faith in it is daily being undermined by the contradictory and inexact statements which are constantly being put forward with a view to make its position more tenable. But we have the fact that these deficiency diseases break out in countries where a certain unvarying diet is partaken of for long periods, while near by, stock seem to be exempt from their attack, due no doubt to some minute alteration in the diet which contains the necessary protective bodies.

As I have already alluded to the similarity in the course of the symptoms, I may here merely remark that the most prominent ones are found in all the diseases we are considering, namely, a general cachexia, with enormous loss of weight, marked nervous symptoms due most probably to degeneration of the peripleral nervous system, centripetal rather than eccentric. And, roughly, we know that all these diseases can be prevented by the addition of certain substances to the food, and in some cases, when the disease is not too far advanced, a cure may be hoped for. In the case of human diseases these substances are known to be organic bases and are termed “vitamines,” those of the beri-beri group and the scurvy group being well recognised, and to some extent interchangeable, though not always. Although veterinary research has not as yet gone thus far, veterinary clinical observation, which I believe I may justly claim as being keener than that of the sister profession, has supplied the missing substances in crude form—bonemeal, ensilage, cattle spices, and so forth; while the beans, always considered necessary for muscular growth and fitness in training stables, supply the vitamins in profusion. Facts that Gryn and Eykman applied to the treatment and investigation of deficiency diseases, and which Worth and myself experimented with in Burma, and resulted in finding that the protective substance is soluble in strong alcohol, and effective even after the elimination of alcohol soluble proteids. The fact that the phosphorus content of some fodders acted as an index to their harmfulness or otherwise, suggested that probably there was a deficiency of certain organic phosphorus compounds in the food, which has sufficed for Schauman to construct his phosphorus deficiency theory.

Investigation has proved that the protective substances, whichever they may be, are soluble in alcohol, in acidulated alcohol, and water; diastable, destroyed by heating somewhat above 100 C. They are neither salts nor proteins. They are easily destroyed by chemical manipulation, and on this account have most probably escaped the observation of earlier investigators,

Funk concluded that, owing to the stability of certain substances from yeast in acid solution, these protective substances are probably nitrogenous, of simple chemical nature and belonging to the group precipitated by phosphotungstic acid, and tracked them down till he obtained a compound with the formula $C_{17}H_2N_2O_7$. The quantity of this substance present is extremely small, 1kg. yielding only .05g., and the curative dose was found to be very small indeed, but varying with conditions of nerve degeneration and subsequent diet; which resulted in some critics considering the substance to be merely an activator—a member of the group of hormones. Subsequent investigation, however, upset this theory and gave rise to another, viz., that the neuritic symptoms of starving animals are dependent not only on phosphorus deficiency but also on nitrogen deficiency in the nerve organs, and that in the absence of the vitamine the organism cannot synthesize its nerve elements; and so deficient metabolism ensues and death results. Here the yeast and currants of the empiric tell.

Vitamine is necessary for the metabolism of the nervous tissue, and its lack forces the animal to take this substance from its own tissues. The result is enormous loss of weight, and when the available stock begins to run short there is a breaking down of the nerve tissue and the resulting symptoms, among which, in the South-Eastern parts of South Australia, is the form of epidemic dropsy so reminiscent of the so-called wet beri-beri.

I have already drawn the parallel between some forms of "coast" and scurvy, the latter being so prevalent on a diet of starch and preserved food and yielding so easily to limejuice and fresh fruit and vegetables, especially onions, as I, after some months on boiled milk and brandy, have reason to be thankful for. The prevalence of scurvy of the gums is responsible for many of the dental troubles which supervene on the attentions of quack horse dentists, and is possibly the reason for the existence of these operators.

One of the symptoms of this form of disease in cattle in South Australia is a blue hyperæmia of the gums, and in some instances ulceration, which have misled me into imagining I had lead-poisoning to deal with until undeceived by chemical analysis. In human scurvy only fresh food possesses the protective power, dried material is entirely valueless; but limejuice apparently is possessed of a greater quantity and that more stable, and offers a promising therapeutic remedy for stock.

In the process of germination seeds are known to develop all kinds of enzymes in order to utilise their food reserves, and grains, such as oats, develop an antiscorbutic agent after they have germinated, but they lose this power when they are dried again. This is also true when the process of ripening is not completed, so that the shrivelled wheat in Australian hay is probably unable to carry on this process, even although its nitrogen content is high.

Infantile scurvy is not uncommon in factory-fed calves and pigs receiving waste milk which has probably been preserved by heat. And although the

vitamine in milk is fairly stable—it is destroyed by heat, the extent of its destruction depending on two factors—the temperature and length of time of heating. Further factors, says Funk, in a passage which is pregnant with importance to Australian dairymen, are the reaction of the milk, the natural content of vitamins in the cow's milk, which, of course, depends entirely on the content of vitamins in the cow's food; and so far we know nothing about them, except the financial loss such ignorance entails.

All the symptoms of the disease we are considering can be produced in miniature in guinea pigs—the loss of hair and weight, the paralysis of the hind legs, and catarrh of the intestines by deficient diet—not deficient in quantity but in protective substances. And their blood is sterile, like those other beasts we deal with. The results of modern investigations in deficiency diseases are not well known to physiologists, and are practically unknown to veterinarians, though Mandel and Emil Fischer have long ago forecasted the results at which we are arriving, and have pointed out that these protective substances have been too easily overlooked.

In the metabolism experiments performed with a view of determining the nutritive value of different proteins the question of vitamins has not been considered, but if they are not present, even though the nitrogen content is high, the animal wastes and fails; consequently in future experiments they must be carefully considered. Abderhalden's experiments in feeding dogs with their own proteins, and his rather too premature conclusion that the question of artificial food is solved, have their value in calling our attention to the length of time an animal can survive upon its own tissues or those closely allied to them, and enable us to understand how the famine cow survives upon dried dung cakes, or the dry bible beast on mummified rabbits that have succumbed to phosphorus in overdoses.

Many years of careful work are still before us before we know much about vitamins and similar protective substances; but my purpose will have been served if by these few observations I have succeeded in arousing among my professional brethren a fleeting interest in them, for it is quite possible that their importance is much greater than has been hinted at in this paper, and a predisposition to many other diseases may be due to a deficiency in these protective substances.

We shall see the whole importance of these protective bodies when we know for what purpose these small quantities of substances are required in the animal organism. It is obvious that the minute amount necessary cannot be considered from the point of view of food, unless they are the ambrosia and nectar of the ferments and hormones, or the favored vintages of the internal glands, such as the thyroid and pituitary.

The further investigation of vitamins, the knowledge of their chemical composition, and their fate in the animal body should help to eliminate from veterinary phrasology such classic terms as dry bible, enzootic paraplegia,

coasting, and other high or low-sounding titles which mean nothing and only serve to raise a smile upon the faces of those who deem we are endeavoring to hide our thoughts in words.

REFERENCES.

Kellner—"The Scientific Feeding of Animals." University of Wisconsin—"Various Reports on Feeding Experiments," "Research Bulletins" (14-18). Armsby and Fries—"The Influence of Type and Age upon the Utilisation of Feed by Cattle." Aston, B. C.—"The Chemistry of Bush Sickness," "Departmental Report, N.Z., 1910," "Journal of Agriculture, N.Z." Bruce—"Report, Tasmania." Theiler—"Agricultural Journal, South Africa." Shaw, T.—"Feeding Farm Animals." New York Agricultural Experiment Station—Annual Report, 1901. Renard, A. H.—"A.B.C. of Scientific Stock Feeding." Thiel, H.—"Landwirtschaftliches Jahrbuch, 1911." Casimir Funk—"Journal of State Medicine, 1912." Manson—"Tropical Diseases." Hebrard—"Le Beri-beri." Eykman—"Virchow's Archives." Fraser and Stanton—"Lancet." Schaumann—"Arch. f. Schiff's u. Tropenhygiene." Kilbourne—"Philippine Journal of Science." Mandel—"Physiologie." Chittenden—"Nutrition of Man." Abderhalden—"Zeitschrift f. Physiologie." Smith—"Veterinary Physiology."

THE CONTROL OF AGRICULTURAL SEEDS IN SWITZERLAND.

By JAMES LONG.

The following article is reprinted from the December number of *The Journal of the Board of Agriculture* :—

A circular letter was recently addressed by Dr. Cyril Hopkins, of the University of Illinois, to agricultural specialists in various European countries, in which he asked what relative proportion of the increase in the crops during a series of years was attributed to each of four factors: better cultivation, more skilful manuring, the increased use of foodstuffs, and seed. In reply, the Director-General of Agriculture in Holland placed the use of commercial fertilisers and improved seeds in the first position. The Director of the Royal Agricultural Experiment Station at Göttingen in Germany attributed 15 per cent. of the increase to better seed. The Principal of the Agricultural Chemical Experiment Station at Halle remarked that the greatly increased yields, especially of wheat, were dependent upon all four factors, of which good seed was one. Wagner, of Darmstadt, remarked that, while further increase by soil-enrichment has a limit, still larger returns require, among other aids, the best bred seeds of the best varieties. The Director of the Rothamstead Experiment Station attributed 10 per cent. of the increase in the crops to improved seed, while the French Minister of Agriculture

gave to seed an importance equal to 15 to 20 per cent. Plant breeders and seed growers in all progressive countries have made great efforts during the past 20 years to improve all varieties of farm plants and none more so than the Canadians and the Germans. Yet it is obvious that, however good the variety, the farmer will reap no benefit whatever from the efforts of the breeder unless the seed is pure and will germinate.

In 1881 the writer paid a first visit to the Seed Control Station at Zürich, then, as now, under the direction of Dr. Stebler. It was a surprise to find that so many samples were examined annually for English, Scottish, and Irish seedsmen. On the occasion of a third visit in July last, it was found that there is now a still larger number of seedsmen who send their samples to Zürich. The process now adopted is much in advance of that of 1881, but the results are not dissimilar. In making each test, two lots of 200 seeds each are drawn from each sample forwarded for examination, and separately tested for purity and germination. It is well known, to all who are acquainted with the characteristics of small seeds, that long experience is necessary to enable an examiner for purity to differentiate not only between the seeds of cultivated varieties of plants—and grasses may be taken as the most conspicuous example—but between the useful seeds and weed seeds. In the purity tests the sample is spread out upon a large sheet of white cartridge paper, and the examiner, with the assistance of a small instrument made of horn, draws each seed from the bulk and examines it separately. In some instances seeds are difficult to identify with certainty. Cocksfoot, for example, is placed upon a glass disc which just covers a hole in the bottom of a box which is enclosed on all sides but one, and blackened within. Beneath is a reflector which throws the sunlight upon the seed, enabling the examiner to recognise it in consequence of its reduced opacity as compared with seeds which resemble it closely in other points.

Dr. Stebler has collected and preserved for the purpose of his work seeds of a very large number of weeds, and these alone are sufficient to enable those least acquainted with the subject to realise the difficulty which exists in recognising all varieties of seeds used upon the farm. The separation of dodder seed (*Cuscuta trifolii*) from clover seed is effected by the agitation of a series of round metal perforated trays, which are placed one above the other. The seed is placed in the tray at the top, and by constant agitation the dodder seed passes from tray to tray until it reaches the bottom free from clover seed.

A large proportion of the seeds tested for germination is placed within a germinator, which is heated to a temperature varying with the species, the season, and the hour of the day from 20° to 28° C. (68° to 82° F.). The temperature is automatically registered throughout. The seeds, all in duplicate, are placed in white saucers made of a specially selected china clay and kept in the germinator for a given length of time, and maintained at a

given temperature. A card is employed for recording the data connected with each sample, and of these 11,000 are used in the year. It is thus possible, by the aid of the splendid system of recording which is followed at the Station, to refer to the details which relate to any sample of seed in a few moments. In some instances seeds such as *Poa pratensis* and *Poa trivialis* are germinated in the sunlight, each saucer being covered with a glass disc, with a hole in the centre for the admission of air.

It is worthy of remark that seeds are sent to Zürich for examination from every important European country, as well as from the United States. In all, 171 firms of seedsmen are under special contract with the station. The number of species of seeds tested since the establishment of the station in 1876 is 149, grasses forming the largest section, and there are practically no data existing which are so valuable for reference as the figures which give the average percentage of purity and germination in each case. In the following table are shown the figures relating to some of the more important of the clovers and allied plants known in this country, tested in the year 1909-10 :—

	No. of Samples.	Average per cent. of		Maximum per cent. of		Minimum per cent. of	
		Purity.	Germin.	Purity.	Germin.	Purity.	Germin.
Red Clover	1,625	95.9	89	99.7	98	82.3	16
White Clover	262	94.2	79	98.8	97	75.9	29
Alsike	190	94.9	90	99.8	99	58.4	56
Lucerne	738	96.1	86	99.6	98	83.8	68
Sainfoin	268	97.4	74	99.7	95	88.6	—
Birdfoot Trefoil	52	93.1	64	98.7	86	87.1	44
(Lotus corniculatus)							
Trifolium incarnatum	14	93.7	76	97.5	96	80.1	13
Trefoil	81	96.2	67	99.8	93	88.5	24
(Medicago lupulina)							
Melilotus alba	15	88.7	51	98.6	63	56.0	42
Yellow Clover	8	88.9	77	93.1	96	84.8	56

It will be noticed that all but two of these species show an average purity of over 93 per cent., while, with the exception of Yellow Clover, no species shows a lower maximum than 97.5 per cent.—the maximum showing what is possible. When we come to germination, each species of seed is found to fall much further below the maximum than in the case of purity. The maximum figures point to the fact that there is nothing inherent in the seeds of any variety to account for the failure to germinate, and, as we shall note presently, the average germination for the period since the establishment of the Station in 1876 until 1910 inclusive, was in most instances even smaller than for the year 1909-10. Again, although the minimum percentage of purity, if we except Alsike and Melilotus, is in most instances approximately near the average, the minimum percentage of germination was so low in almost every instance that without some form of control the purchasers of seeds of these species would often find it difficult to obtain a good sample.

The figures showing the average purity and germination of these species of seeds, as tested at the Station during a period of 35 years, are an excellent guide both to farmers and seedsmen, though it should not be taken for granted that an ordinary sample is of necessity first class, if it is equally good. Although the average purity of Clovers and Trefoils is excellent, the same cannot be said in every case of their germination.

Average Purity and Germination, 1876-1910.

	Purity.		Germination.	
	Per cent.	No. of Samples Tested.	Per cent.	No. of Samples Tested.
Red Clover	96	22,691	90	20,639
White Clover	95	3,053	82	3,258
Alsike	95	3,428	85	3,520
Lucerne	96	9,611	91	8,650
Sainfoin	97	5,432	87	6,885
Birdsfoot Trefoil	92	412	66	396
<i>Trifolium incarnatum</i>	95	212	88	374
Trefoil	96	871	76	1,095
<i>Melilotus alba</i>	93	70	65	65
Yellow Clover	86	20	69	20

The average purity of Red Clover in 1909-10 was identical with the average of 35 years, while the average germination was only 1 per cent. less. It will be noted, however, that there were considerable variations in the germination percentage of Lucerne, Crimson Clover, and some other species, which suggest either a bad seed-growing season or a series of inferior samples. In any case, the figures indicate the value of the averages of the longer period. It is a noteworthy fact that, although the samples of Red Clover received from England were practically equal in purity to those received from other countries, their germination percentage was the lowest in the list, viz., 82 against 94 for a much larger number received from France, and a general average of 89.

Details relating to the grasses present some instructive facts. Thirty species were examined and tested during the year 1909-10, whereas 49 species have been tested since the establishment of the station. The most popular grasses, judged by the samples examined, are, placing them in the order of the numbers submitted in the year 1909-10—Cocksfoot (581), English Rye Grass (481), Tall Oat Grass (473), Sheep's Fescue (388), Italian Rye Grass (382), Foxtail (313), Smooth-stalked Meadow Grass (277), Meadow Fescue (275), Crested Dogtail (246), Fiorin (240), Timothy (186), Rough-stalked Meadow Grass (176), Golden Oat Grass (103), and Tall Fescue (100). Cocksfoot and Golden Oat Grass provided the most numerous samples during the period 1876-1910, viz., 13,219 and 10,391 respectively, being followed in much smaller numbers by English Rye Grass, Italian Rye Grass, Meadow Fescue, and Sheep's Fescue.

In 1909-10 the Rye Grasses, Timothy, Dogstail, Meadow Fescue, and Sweet Vernal Grass exceeded an average of 90 per cent. purity. Cocksfoot, however, only reached 74 per cent., Foxtail 68 per cent., Golden Oat Grass 67 per cent., Yorkshire Fog—which is regarded as a useful variety in Switzerland—59 per cent., and Soft Brome 50 per cent. On the other hand, Timothy alone exceeded 90 per cent. germination, the figures varying for all the most useful species from 54 per cent. for Sweet Vernal to 87 per cent. for Tall Fescue.

The variation in the samples was remarkable. The maximum of purity exceeded 90 per cent. in all the leading varieties, while the minimum, with one exception—Timothy Grass—varied from 5.5 per cent. in the case of Sheep's Fescue to 72 per cent. for Sweet Vernal, eight species falling below 20 per cent. It is, however, in connection with germination that we get the worst results. Thus, *Festuca ovina*, *Festuca tenusfolia*, *Festuca rubra*, and *Poa nemoralis* gave no results in the poorest samples, Meadow Fescue gave only 1 per cent., Tall Oat Grass 2 per cent., Italian Rye Grass and Soft Brome 3 per cent., Golden Oat Grass 4 per cent., English Rye Grass 10 per cent., Sweet Vernal 12 per cent., Fiorin 17 per cent., and so on, until we reach 46 per cent. for Tall Fescue, and then 73 per cent. for Timothy, which takes the highest place for both purity and germination.

It will be well to complete this examination with a table showing the average percentage of purity and germination during the period 1876-1910 of the leading grasses used by farmers in this country. The value of the work of Dr. Stebler is practically concentrated in these figures—

Average Purity and Germination, 1876-1910.

	Purity.		Germination.	
	Per cent.	No. of Samples Tested.	Per cent.	No. of Samples Tested.
Tall Oat Grass	80	10,391	78	9,975
English Rye Grass	95	7,247	82	8,007
Italian " "	95	6,293	80	6,862
Cocksfoot	77	13,219	83	13,030
Timothy	98	3,749	93	3,994
Dogstail	91	3,057	77	3,392
Foxtail	75	4,090	69	4,218
Meadow Fescue	94	5,433	83	5,864
Tall " "	85	1,151	83	1,211
Sheep's " "	76	4,674	74	5,062
Smooth-stalked Meadow Grass	85	4,197	67	4,432
Rough " "	88	1,458	76	1,508
Wood Meadow Grass	79	1,572	72	1,617
Golden Oat "	71	1,762	62	1,672
Fiorin	75	2,782	84	2,730
Sweet Vernal	91	710	52	808
Yorkshire Fog	69	1,296	67	1,388

There is a wide difference between the maximum purity and germination of the above species, and the averages as determined over the lengthy period

of 35 years. Although in some instances, as in the case of Foxtail, samples of seeds are notoriously deficient in purity or germinating power, or in both, the fact remains that it is quite possible to obtain seeds of the great majority of species which are much superior to the average samples shown by the above table.

Seeds of 86 species of foreign plants, roots, grain, vegetables, and timber trees were examined and tested during the same period, but in extremely few instances was the percentage of germination high. The purity of the seed of forage crops exceeded 94 per cent. in every instance, but the germination varied from 63 per cent. for sorghum to 87 per cent. for maize. Peas, beans, and vetches were excellent from the point of view of purity, but all the species of lupins gave low returns for germination. The four leading cereals gave an average of 97·5 per cent. for purity, but only 86·5 per cent. for germination. Hemp and linseed were equal with 97·9 per cent. purity and 83 per cent. germination, while the large number of roots and vegetables, with the exception of carrots and parsnips, exceeded 90 per cent. purity, although in no instance was 90 per cent. of germination reached. Thus, carrot seed fell to 60 per cent., parsnips to 45 per cent., spinach to 63 per cent., tomatoes to 63 per cent., parsley to 56 per cent., onions to 59 per cent., leeks to 58 per cent. Among the seeds of timber trees, pine and larch were by far the most numerous, 21,800 samples of the two species being examined and tested for germination, and averaging 93 per cent. and 95 per cent. purity, but only 70 per cent. and 71 per cent. for germination. Of 32 species of seeds examined and tested in this section, all but four reached excellent figures for purity, but the great majority of the seeds tested germinated very badly. The lowest place is taken by the birch, with 28·9 per cent. purity and 23 per cent. germination.



A HARVEST FIELD.

POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

OPERATIONS FOR FEBRUARY.

MOULTING.

Over the greater part of the settled portion of the State the summer so far has been remarkably mild—a few days heat and then a cool change. The effect has been general retarding as far as the annual moult is concerned. In a great many cases the birds are still carrying their old feathers, and show signs of doing so for some weeks at least. In other cases, especially with two-year-old breeding hens, there has been a natural gradual moult and a complete replacement of the plumage. This form of moulting is the natural one; the sudden rapid moult is what the eggfarmer likes, because the check is of short duration. Many hens lay well during a normal, slow moult. Moving fowls from one place to another generally precipitates a moult. This has been a source of trouble to many competitors in the laying tests. Fowls (hens or pullets) if moved when in full lay are prone to moult. These moults are often called false moults. This term seems to be used indiscriminately, whether in reference to an out-of-season full moult, or when only a partial change of plumage results. Pullets which have not long acquired their adult plumage often moult again when moved. It must be remembered that in such cases the pullet is not carrying as much feather as she would if they had developed for a few more months; therefore what is often called a false or partial moult may appear so because of the scanty number of feathers lying about, and yet it is in reality generally a full moult.

Forced Moults.—Many breeders have experimented in the direction of precipitating or forcing a moult. Except in rare cases it is doubtful if it is wise to do so, providing the fowls have been well fed on food containing all the necessary constituents. As I have shown in my book on “Foods and Feeding,” the majority of poultry breeders do not study the question in anything like the thorough manner this important question deserves. For forced moulting the general method is to close house (in a warm house) the lot of birds to be experimented with. Feed well for a few days, and then reduce the food to starvation rations—say a quarter of the amount formerly given. Keep them on this for a week, and then feed heavily, allowing a large percentage of fat in the foods. Stewed linseed mixed in the mash—which may contain a third of ground maize—plenty of stout oats and whole

maize in the scratching litter, will provide this. Failing a supply of linseed, maize, and oats, use any kind of sweet fat (tallow, dripping, lard, suet, &c.) at the rate of a pound to each 40 birds. Such a procedure, however, can only be recommended in cases where the old feathers show no signs of falling naturally. Properly fed fowls should moult naturally, and if of good laying strain there will not be a total cessation of egg production among the flock.

THE STOCK.

Readers are again referred to previous remarks upon the subject of feeding and general attention to the stock. To new readers it may be again pointed out that the stock needs special attention at this time of the year. Old and worn-out birds should be discarded; the room they occupy and the food they consume can be put to better use. Valuable breeders may be kept for another season if they are not too old—hens up to five years old, cocks up to at most four years. Hens which have been accurately tested and proved to be good layers of standard eggs with good shells, and which have not been sick, nor have shown any signs of broodiness, are worth keeping as long as they will lay. Old cocks, those over three years, are slow to moult, and can only be depended upon in the spring, say August and September. In order to keep up a certain line of breeding it may sometimes be necessary to keep such old birds.

Cockerels need very special attention, and do much better if penned in small flocks or singly. In flocks there is often great fighting and loss. Some people think it a good plan to let them fight it out, and then keep the survivors as "the fittest." This is not a commercial idea, nor is it profitable, and it certainly is not scientific. Remember the future breeding male bird will be the sire of all the chickens bred from the hens he is mated with; therefore, he must be a good one in every respect. Many farmers pay little heed to this. They like a change every year, and they get a cockerel or two on the same plan so many adopt in choosing a bull or a stallion for service. They like something cheap, and cast all thoughts of breeding value, heredity, and future utility to the winds. A large number of readers of these notes are poultry breeders; even they cannot pay too much attention to this point. Constitution and vigor should be the first points looked for when making your selection of cockerels from a flock bred from high-class laying strains. Lusty, vigorous crowing, bright eyes (red in the White Leghorns), medium-sized upright comb with not too many serrations, medium wattle, and plenty of tail and hackle feathers are all to be looked for. A strong beak and well-boned shanks with fairly large feet and straight toes are all good points. The legs should be far apart, and the bird, while broad-chested and with a good back, should neither be a bantam in size nor, on the other hand, an overgrown monstrosity. A well-balanced bird looks well, and should not be too large; you can generally get size, if you want it, by using large hens.

The hens for breeding tax the breeder's knowledge when the time comes to make up the breeding pens. The hen gives size to the progeny, not the male bird. The small hen—in the laying breeds—is generally thought to be the best layer. The reason for this assumption is that in producing our laying strains the small American birds were used, and some of the progeny have been equally small, but have inherited "laying." The world's record pen and their parents were large birds—much larger than the average South Australian White Leghorn hens or pullets. I have always advocated more size, but without coarseness or oversize. So-called Leghorn hens weighing 8lbs. or 9lbs. are clearly too large, and are not typical of the original breed. In selecting the breeding hens, if your operations are on a small scale, retain one or two of the small hens to keep up the "quality" as it is called. If you have a large number of breeding pens you may either mate up separate pens of the small, the medium, and the large types, or you may include all three in one pen so that you may have, through the males, a greater number of matings. One male mated with hens of any of the three types may give better results with all or with one type of hen than another male. At the poultry stations we breed our males and select them to a standard type, and so far the results are eminently satisfactory. Three main types of hens are bred from—the small (relatively), the medium, and the large. No oversized, coarse hens are retained; nor are the very small, pipestem-legged runts used. Mated with a certain male bird a small hen will breed some large progeny, but most of them are small; the large hens will also produce some small progeny. This depends on the breeding of the male bird. With the same male bird the medium-sized hens will breed either all medium-sized or about equal numbers of large and small, according to the breeding of the male bird.

The pullets should be kept growing, and every means taken to prevent early laying. Five to five and a half months old is quite soon enough. Every endeavor should be made to single test a number of the best pullets. Select those which will begin to lay about the 1st of March and pen them separately. I am well pleased with the demand there has been for copies of the bulletin on "The Single Testing Method of Breeding Fowls for Egg-production." Numbers of breeders have written, others have called and explained their operations, and have also submitted some interesting and excellent records. Much that is foolish is written by English and American writers upon this subject—they do not apprehend the essential points in breeding. The man who each year single-pens a dozen or 20 specially-bred pullets will always have a reliable pen to breed from, and if he operates successfully will each year have a certain number of first-class layers. These first-class layers—even when kept for market eggs only—are always worth reselecting for use during a second season. Trapnesting is unsatisfactory and obsolete; the single method is the only correct and scientific method

Even if you can only ~~test~~ and breed from a few tested hens each year, you can use every good cockerel so bred as a breeder, and in this way alone you will raise the average of your main flocks each year.

BUILD PROPER HOUSES.

Although we are not half-way through the summer season, there will, in a few months, be a return of cold, wet weather. Many breeders have good laying strains and feed correctly, but only a few, comparatively, house their birds properly. Although hard pressed for time, it is very satisfactory to report that numerous applications are received for working drawings of houses and lists of material required. For the average breeder I recommend a block of breeding yards and houses of standard size. In addition, a scratching-shed house is designed. For the suburbs, and back yards generally, the scratching-shed house is the best. A long shed, say, 100ft. long by 17ft. deep, 8ft. high in front and 6ft. at the back can be divided into five or 10 compartments. In these you can breed and keep a lot of fowls. In some compartments you can have brooders, in others the growing cockerels and pullets, and in the balance the laying hens. You may even in a 100ft. shed with 10 divisions have two pens of stock birds. When the value of housing is properly understood and given effect to, then we shall hear less complaints and there will be a great many more eggs sold and young stock reared.

POINTERS.

Provide ample shade for your birds. Suburban breeders are frequently neglectful in this matter.

Keep the drinking water in clean, well-shaded receptacles. Replenish twice a day in winter and three times at least in summer.

Give your birds plenty of green food. If you have an insufficient supply of lucerne, kail, &c., and cannot obtain any you should sprout oats and use when the shoots are about 6in. in length.

All scaly-legged fowls should be attended to. Scrub the legs in hot, soapy water, using a stiff brush. Dry, and then smear with ordinary softsoap. A second application is rarely needed.

Sweep up all feathers cast by moulting poultry and burn them. Provide a good dust bath; it will assist the moulting process and rid the birds of vermin.

Eradicate all vermin infesting the houses, nests, and fences. Use kerosine and soap suds as hot as you can manage.

Intestinal parasites (round worms) have caused much loss this year. The prescription (santonine and areca nut) published by me in a recent report is the most satisfactory remedy. Do not use turpentine, as recommended by some writers, its effect on the kidneys is disastrous. Scores of breeders who used the santonine and areca nut prescription report excellent results.

In practically every instance the cause of the recent mortality was worms. This I proved by numerous post mortem examinations.

Market your eggs frequently. During the warm weather the eggs should be collected several times a day. Even infertile eggs undergo chemical changes if exposed to great heat. Fertile eggs will germinate.

Use proper egg crates, fitted with cardboard fillers and woodwool pads. You save money in time and absence of breakages. Wash all eggs with dirty shells. Many eggs sent to market have a disgusting appearance. It betokens slovenly methods and dirty habits on the part of those who market eggs in such condition.

Breed table poultry next season. There is a big demand and prices are high. Mate up your birds in March and breed as many as you can. The chickens will be ready in August or September when markets are bare and prices high.

Orpingtons, black, white, buff; Wyandottes, all varieties; Plymouth Rocks, barred, white, buff; Langshans (Croad type); Rhode Island Reds are all to be recommended as pure breeds for table-bird breeding.

For producing crossbred table poultry use hens of the above breeds mated with Indian Game cockerels.

Overlarge, coarse-headed hens are generally poor layers. The large, heavily feathered, blocky Orpingtons admired in the show pen do not lay as well as the closer feathered, long-bodied birds.



Apiary of Mr. R. McDonald, Eyre's Peninsula.

THE POULTRY STATIONS.

SCHEME OF AMALGAMATION.

By D. F. LAURIE, Poultry Expert and Lecturer.

A scheme for amalgamating the existing three poultry stations and concentrating all experimental and other work has been approved by the Hon. Minister of Agriculture, and will be given early attention. A central station easy of access to the many who visit the city at frequent intervals, as well as the city and suburban residents, will serve a much greater purpose than do the three which are now visited by comparatively few people. For a great many years—as a writer, and in lecturing and advising—I have pointed out that with attention to housing, &c., all portions of the State are suited for poultry production.

The Roseworthy poultry station has attracted the attention of the world as far as poultry matters are concerned. At Kybybolite the scratching-shed system has proved beyond all doubt that egg production can be made as profitable in the South-East as in the North if proper methods of housing are adopted. Kybybolite has therefore achieved its end, and there is no need to continue experiments which in a measure duplicate those carried out at Roseworthy. The Roseworthy poultry station is in a most inaccessible position—a whole day is barely long enough for a visit, as so much time is spent in going and returning. Murray Bridge is a commercial egg production station at which no special experimental work is carried out. In addition, there are many other reasons which need not be specified, all of which are factors in the necessity for concentration in one locality devoted to the purpose.

STATE POULTRY STATION.

There will now be one central State poultry station, and it will be at Parafield, about a mile on the city side of Salisbury, and about 10 miles distant from Adelaide. The poultry plant will be erected facing the railway line, and will be in full view of the thousands who travel to and from the city. The distance is convenient, and the road from Adelaide is fairly good. Visitors may reach it per bicycle, trap, motor car, charabanc, also by rail (with an excellent train service). For the general public there will be fixed, convenient visiting days; for inter-State, oversea, special parties, Agricultural Bureaus, and other bodies, special arrangements will be made as occasion demands.

The objects are to carry on the laying competitions and various food experiments. The dry mash and other systems will be in constant progress for purposes of comparison, and all experiments will be upon a large scale.

Breeding and incubation and other experiments will be carried out. Reports of these will be issued at intervals or upon completion. Table-bird breeding will form a special branch, and every effort will be made to stimulate this neglected branch of the industry. There is no intention of establishing a menagerie by means of a collection of all breeds available. Quite a number have been tried at the poultry stations and found wanting. Others likely to give better results for the average man will receive attention. When this branch is established the co-operation of breeders will be sought with the view of holding an annual table poultry show, and by other means assisting to popularise the general purpose fowl. Turkeys will probably be bred—there is need for work in this direction.

Egg Production.—It is intended to keep some thousands of laying hens and pullets for market eggs to provide a good revenue to pay for the work. Not only is this course both possible and desirable, but the needs of the day are definite work in, and information upon, the results of large numbers of fowls kept solely for market eggs.

THE PLANT.

[There will be large accommodation for incubators, as there are quite a number of machines now in use. A large building will be converted so as to provide two large incubator rooms. Two large brooder houses, each 100ft. long, will be erected, one upon the system now in use and the other upon a new plan I have in view. Food houses and other buildings will be needed. Barossa water will be laid all over and a good supply assured.

The poultry farm will be laid out in rectangular blocks of yards to provide accommodation for rearing chickens, &c.; for breeding stock and experimental work; for egg production, including feeding tests; for table bird production; for laying competitions and public single testing.

As a beginning, and to facilitate transferring the three existing poultry stations without interrupting the work, it will be necessary to erect a new block of competition yards, and also a block of breeding yards, laying houses, and other plant. Added experience will be evident in the remodelled plant. The houses will be larger and higher, and those used for the competitions can at any time be used for housing laying hens or breeding stock. At the back of each row of houses (built on the continuous system) there will be a block of ground of the same size as that occupied by the yards in front, facing north. These blocks will be planted with lucerne, kail, rape, mustard, &c. In the course of years these cropping blocks will be used as runs or yards, and the yards in use, with divisions removed, will be cropped continuously. Each year kail will be planted where possible in the various runs. By these methods the ground will be kept sweet. The whole scheme involves a great deal of work in removal and re-erection, but the subsequent results, both in efficiency and economy of working, will be excellent. Part of the food

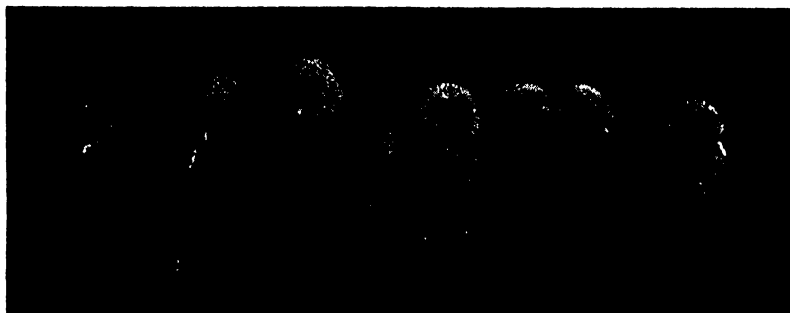
required will be grown upon the farm. A few colony houses will be used to illustrate the advantage of the system as applied to farms generally.

KYBYBOLITE COMPETITION DISCONTINUED.

As it has been decided to transfer Kybybolite poultry farm to Parafield, the laying competition which was to have started on April 1st, 1913, will be abandoned. All South-Eastern breeders who so wish are welcome to compete at Parafield; the ensuing 1913-14 competition will begin at Parafield on April 1st, 1913. There was no prospect this year of obtaining any increase in the number of entries at Kybybolite, and without liberal support competitions cannot be conducted.

LEARNING THE BUSINESS.

There is always a demand for trained assistants who thoroughly understand modern methods. In a few cases assistants from the poultry-stations have done well on private farms. The new poultry station will offer excellent opportunity for teaching pupils, many of whom may take up poultry-breeding on their own account. There will be thousands of visitors during the year, and the object lessons to be learned will no doubt be of great assistance in building up the industry in all branches. The ease with which Parafield can be reached will be welcome news to the many who would visit Roseworthy but for the time required and the expense of the journey. On visiting days it will be possible to explain all methods to parties of sightseers. Large scratching shed and other houses will be in use, so that one may select the style which most appeals to him. As already indicated, the 1914 and subsequent laying competitions will be made up of pens of 10 pullets instead of six as at present. The housing and yarding accommodation will be suitable. Accommodation for single testing some hundreds of pullets each year will also be provided, and probably a test for breeders will be made.



NOTES ON EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

The appended reports of the Superintendents at Roseworthy and Kybybolite give interesting details of the past month's records. The general results may be considered satisfactory, but it is futile to attempt forecasting final results at this juncture. The public interest in these competitions is fully maintained. That the breeders are all fully impressed with the value of public records gained in officially-conducted tests, the large entry already made for the forthcoming competitions is ample proof. Reference is made elsewhere to the scheme for concentrating all work—including laying competitions—at one station, viz., Parafield, near Salisbury.

ROSEWORTHY.

The Superintendent reports—The period under review was the tenth month of the test. Seasonable influences are responsible for the variations which occur among the pens, especially those occupying positions in the first 12. Several pens now contain one or more birds which are undergoing a moult, and the scores will naturally decline. The effects of fluctuations in temperature, such as a difference of 37° noted during the two days, 27th and 28th, seriously affect the birds. The temperature on the 27th registered 110·8°, with a strong north wind and blinding dust storm. After the change a temperature of 73°, and a strong south-west wind on the 28th, were experienced. These changes in temperature, accompanied with strong wind, plays havoc with the birds, and so upsets the general laying as to spoil any averages which might be possible with calmer and more settled conditions. The yards are well protected by break-winds, but nothing short of a weather-proof yard could screen the birds under the weather conditions mentioned. The wind has on several occasions this month been so strong as to carry away the greater part of the scratching litter which had been paced in the pens. The general health of the birds has been good; a few cases have occurred which necessitated replacements. Cases of birds showing ovarian trouble, leg weakness, vent troubles, &c., are more frequent than desirable, and show that a decided strengthening is needed in the blood of the various strains of layers if a general all-round efficiency is desired. Deaths occurred as follows:—Section 1, one hen; section 3, one—the former through paralysis, the latter general wasting. Broodiness is still too pronounced, as the following entries for the month will show:—Section 1, 50; section 2, 105; section 3, 9; total, 164. Inter-State entries are looking well, and continue to do fair work, as a glance at the list of scores will prove. Several of these entries are well up on the list, and others which are farther down are putting up weekly scores which may be considered good for the time of year, and there is every indication that some of the prize money will again find its way to Victoria this year. The weather during the month has been of a dry and boisterous nature, with eight points only of rain and an average maximum temperature of 85·8°. The highest reading was 110·8°, average minimum 50·9°, lowest reading 36°; windy conditions prevailed on 24 days—chiefly south-west to north. Eggs laid during the month show a falling off in numbers compared with previous monthly results, and also show a slight decrease in size of eggs on the whole. The numbers laid are as follows:—Section 1, 8,314; section 2, 2,376; section 3, 2,188—total production from 804 hens (134 pens), 12,878. No sensational laying has been recorded from any individual pen, although a fair pen average has been maintained, and general averages are still equal to those of previous tests. Grand total to date, 124,039 eggs.

KYBYBOLITE.

The Superintendent reports—The general health of the birds has been good—only one death occurring. Though a considerable number of the birds are moulting slightly they all have a healthy and bright appearance. The laying is easing up all through the competition; this is due to the moult and changeable weather. The maximum shade temperature was 108°, and the minimum 41°. The days have been warm to hot, with cold nights. Wind was registered on 18 days, being more or less severe. In section I. 12 birds had to be removed to the broody pen, and in section II. 15 gave trouble; some of the hens were very persistent.

D. F. LAURIE, Poultry Expert and Lecturer.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended Jan. 31st.	Total Eggs Laid from April 1st, 1912, to Jan. 31st, 1913.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Cowan Bros., Burwood, N.S.W.	93	1,140
Tabuteau, J. O., Black Rock, Melbourne	89	985
Hodges, H., Pyalong, Victoria	169	1,060
The Range Poultry Farm, Toowoomba, Queensland	84	1,022
Brundett, S., Moonee Ponds, Victoria	126	1,124
Jessup, W. C., Caulfield, Victoria	98	1,013
Dawes, J. H., Granville, Sydney	98	1,136
Beadnall Bros., Gawler	102	1,159
Redfern Poultry Farm, Caulfield, Victoria	130	1,011
Kerr, R., Longwood, S.A.	93	1,145
Eckermann, W. P., Eudunda	69	1,065
McNab, J. A., Sandringham, Victoria	88	943
Mazey, P., Albion	84	803
Broderick, P. J., Gawler	72	888
Redfern Poultry Farm, Caulfield, Victoria	124	983
Braund, J. E. and H. J., Islington	106	959
Dunn, L. F., Keswick	125	1,011
Hocking, E. D., Kadina	106	997
Groom, E., Peterhead	91	934
Pope, R. W., Heidelberg, Victoria	116	1,148
Haines, T. F., Fullarton Estate	74	865
Provis, W., Eudunda	126	1,007
Burton, W. S., Moonta Mines	97	972
Broster, G., Mallala	125	1,063
Brain, J. H., South Yan Yean, Victoria	110	1,009
Sargenfri Poultry Yards, East Payneham	115	1,188
McKenzie, H., Northcote, Victoria	128	1,142
McDonnell, J., Greytown, Rosewater	111	1,052
Browne, A. R., Hawke's Bay, N.Z.	94	1,110
Brain, J. H., South Yan Yean, Victoria	92	894
Marsson, C., Welland	115	808
Hutton, C., Parkside	75	866
Miels, C. & H., Littlehampton	98	893
Moritz Bros., Kalangadoo	106	1,043
Codling, H., Mitcham Park	116	880
Troughbridge Poultry Yards, Edithburg, Y.P.	103	913
Irvine, A. W., Epsom, Auckland, N.Z.	83	902
Walker, P., Hicksborough, Victoria	102	944
Lampe, B., Kadina	91	748
Waite, F. J. O., Nailsworth	102	1,077

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended Jan. 31st.	Total Eggs Laid from April 1st, 1912, to Jan. 31st, 1913.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS—Continued.		
Badcock, G., Mile End	101	905
McClelland, A., Mordialloc, Victoria	105	829
Tomlinson, W., Clarence Park	105	983
Roberts, L. L., Kadina	73	961
"Strathcona," Long Plain	109	1,021
Whitegate Poultry Farm, Deepdene, Victoria.....	169	939
Purvis, Miss Gracie, Glanville	101	1,022
Padman, A. H., Hyde Park	91	1,023
Sickert, P., Clarence Park	122	1,057
Purvis, W., Glanville.....	118	1,041
Rice, J. E., Cottonville	108	1,116
Hamill, H., Kogarah Bay, Sydney	108	966
Gurr, W. E., Kapunda	112	959
McLeish, E., North Adelaide.....	83	948
Craig Bros., Hackney.....	104	978
Uren, Mrs. P. A., Kapunda	106	1,238
Perry, Wm., Murrumbidgee, Victoria	80	886
Nancarrow, J. T., Port Adelaide	85	772
Bertelsmeier, C. B., Clare	104	1,016
Tockington Park Poultry Farm, Grange.....	100	1,021
Trenwith, T. H., Kadina	103	887
Knappstein & Bray, Clare	79	856
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	86	939
"Denebollow," Caulfield, Victoria	82	890
Hill, Chas., Monarto South	36	610
"Islay," East Malvern, Victoria.....	95	917
Cosh, A. J., Burnside.....	130	1,076
Indra Poultry Farm, Freeling	70	873
Whitrow, A. J., Knoxville	94	961
Hall, T. C., Rose Park	104	958
Ontario Poultry Farm, Clarendon.....	78	948
Howlett, H., Moonta	112	928
"Koonoowarra," Enfield	98	989
Hall, A. W., South Oakleigh, Victoria	128	1,155
Convent of the Good Shepherd, Oakleigh, Victoria	101	884
Carne, E. A., Kangaroo Flat, Victoria	123	1,028
Navan Poultry Farm, Minlaton	89	840
Lillywhite, R. G., Fullarton.....	95	1,023
Gibbs & Pine, Queenstown	105	762
Hughes, J. J., Elsternwick, Victoria	106	867
Shamrock Poultry Farm, Perth, W.A.	90	847
Bertelsmeier, C. B., Clare	104	961
Nancarrow, J. T., Port Adelaide	105	935

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Robertson, F. H., Northam, W.A.	65	678
McKenzie, E., Northcote, Victoria	85	711
Mitchell, B., Bendigo, Victoria	83	687
Provis, W., Eudunda.....	86	773
Kenway, D., West Pennant Hills, Sydney.....	85	875
Cowan Bros., Burwood, N.S.W.	92	916
Kenmore Poultry Farm, Dandenong, Victoria	85	861
Brundett, S., Moonee Ponds, Victoria.....	87	809
Cant, E. V., Richmond	99	847

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Jan. 1st, 1913.	Total Eggs Laid from April 1st, 1912, to Jan. 31st, 1913.
SECTION II.—HEAVY BREEDS—<i>Continued.</i>		
BLACK ORPINGTONS—<i>Continued.</i>		
Craig, Mrs. C., Hackney	86	767
Lampe, B., Kadina	71	720
Wirraparinga Poultry Yards, Plympton	81	717
Phillips, A., Portland, S.A.	92	746
Martin, B. P., Unley Park	78	924
Nancarrow, J. T., Port Adelaide	47	456
Padman, J. E., Plympton	68	823
Francis Bros., Fullarton	64	677
Hall, T. C., Rose Park	87	849
Tookington Park Poultry Farm, Grange	86	733
Bertelsmeier, C. B., Clare	67	765
Craig Bros., Hackney	101	900
Bertelsmeier, C. B., Clare	89	762
SILVER WYANDOTTES.		
Dunn, L. F., Keswick	75	920
Tidawell, H. J., Mitcham Park	44	699
Moyes, S., Blyth	56	681
Perry, Wm., Murrumbena, Victoria	56	689
"Denehollow," Caulfield, Victoria	72	769
Western, F. C., Marion	79	859
SALMON FATEROLLES.		
Courtenay, K., Mordialloc, Victoria	66	812
LANGSHANS.		
Stevens, E. F., Littlehampton	79	898
PLYMOUTH ROCKS.		
"Koonoowarra," Enfield	65	760
SECTION III.—SCRATCHING SHED SECTION.		
WHITE LEGHORNS.		
Sickert, P., Clarence Park	127	1,109
Tomlinson, W., Clarence Park	112	1,163
Moritz Bros., Kalangadoo	132	990
Codling, H., Mitcham Park	93	892
Sargenfri Poultry Yards, East Payneham	138	996
Purvis, W., Glanville	93	928
Bertelsmeier, C. B., Clare	91	1,012
Padman, A. H., Hyde Park	126	1,136
Hocking, E. D., Kadina	121	961
Beadnall Bros., Gawler	94	901
Brain, J. H., South Yan Yean, Victoria	90	727
Provis, W., Eudunda	114	1,024
Redfern Poultry Farm, Caulfield, Victoria	124	1,068
Broderick, P. J., Gawler	110	925
"Koonoowarra," Enfield	87	845
Lillywhite, R. G., Fullarton	115	965
Cosh, A. J., Burnside	91	868
Indra Poultry Farm, Freeling	120	954
Whitrow, A. J., Knoxville	105	964
Tookington Park Poultry Farm, Grange	105	1,003

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended Jan. 31st, 1913.	Total Eggs Laid from April 1st, 1912, to Jan. 31st, 1913.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	113	1,147
Dow, A., Glencoe West	79	1,020
McNamara, Mrs., Mount Gambier	74	900
Moritz Bros., Kalangadoo	142	1,312
"Mahama," Mount Gambier	131	1,086
Holmes, F. A., Frances	94	1,107
Sudholz, A., Kalangadoo	59	865
Staunton, S., Naracoorte	99	880
Hall, C. W., Mount Gambier	89	978
Moritz Bros., Kalangadoo	113	1,150
Vorwerk, K. E., Millicent	125	1,113
Vorwerk, H. F. & A. C., Millicent	100	1,062
Jarrad, J., Mount Gambier	80	1,016
Bartram, T. A., Kybybolite	78	1,062
Vorwerk, H. F. & A. C., Millicent	91	938
Jenkins, R. D., Kybybolite	65	866
Arthur, J. S., Bordertown	99	936
Drake, C., Naracoorte	90	966
"Eurinima," Kybybolite	99	1,067
Smith, M., Hynam	87	968
Lacey, F. C., Kybybolite	87	1,238
"Herdfield," Mount Gambier	122	1,238
Blue Lake Poultry Farm, Mount Gambier	99	946
Beaton, W. J., Tantanoola	120	1,058
Bennett, E., Kalangadoo	125	904
Jones, H. F., Mount Gambier	72	882

MINORCAS.

James, S. T., Mount Gambier	84	749
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdfield," Mount Gambier	95	994
Blue Lake Poultry Farm, Mount Gambier	32	563
McNamara, Mrs., Mount Gambier	85	568

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	59	727
Osborne, W. F., Kalangadoo	96	828

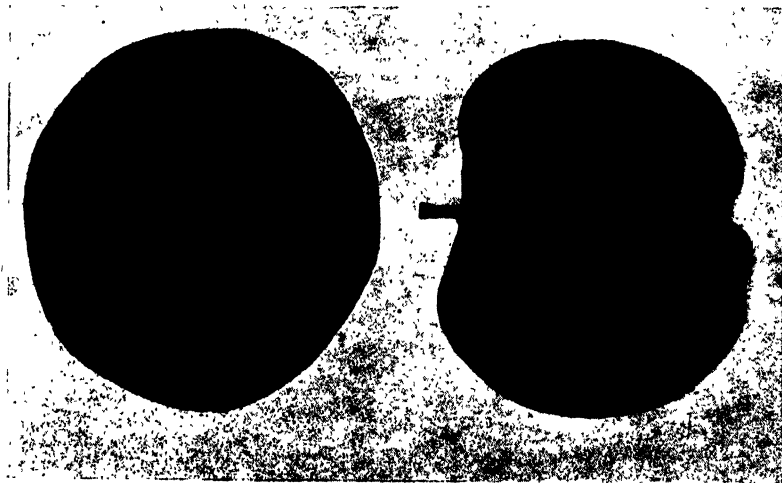
PLYMOUTH ROCKS.

Bishop, R., Mount Gambier	40	598
Glenelg River Poultry Farm, Mount Gambier	39	587

D. F. LAURIE, Poultry Expert.

APPLE—LONDON PIPPIN.

(Syn. *Five-Crowned Pippin*.)

**FRUIT.**

Size—Medium to large, good specimens measuring 3in. wide by 2½in. high. *Shape*—Roundish, flattened slightly, ribbed on sides, such ribs increasing into ridges as the calyx end is approached, where they culminate in five distinctly-placed ridges; hence the reason for being called a five-crowned pippin. *Color of Skin*—Very pale-green when immature, changing with ripening to a lemon yellow with a brownish-red coloration upon the exposed side. When grown under cool conditions this brown sometimes is substituted by a clear reddish-pink shade. *Eye*—Small, closed, and set in a very shallow uneven basin. *Stamens*—Marginal, upon a funnel-shaped tube. *Stalk*—Slender, and about ½in. long, set somewhat deeply in a basin, the walls of which are usually lined with a pale-greyish russet skin. *Flesh*—Yellowish-white, crisp, tender, and juicy, with a brisk, pleasant, but non-aromatic flavor. *Seed Cells*—Round, axil, closed.

TREE.

A medium grower, often tardy in vigor at the outset, but afterwards assuming a sturdy, somewhat spreading habit. It forms naturally short, closely well arranged fruit spurs along the framework arms and limbs, and these do not require summer pruning to induce them to fruit freely. The bark of the wood is dull-brown in color, the young shoots being dull, grey, and hairy. The leaves are downy, large, stiff, fleshy, and dark-green on young shoots, turning much smaller and paler on mature trees. *Liability to*



LONDON PIPPIN APPLE.

A. Vaughan, Govt. Photographer.

disease—This variety is rather subject to the black spot (*Fusicladium*) fungus, and rains in late summer will often set up a second attack upon this fruit at harvesting time. It is not, in this State, severely affected by bitter pit, and in fact is almost immune from this defect. *Climatic Requirements*—It is essentially a cool country variety, yielding the best fruits when grown in the ranges south of Adelaide, or in the South-East, where the soil is cool and the nights moist. *Period of Blooming*—Towards the end of October, and a little later than such popular kinds as Jonathan and Cleopatra. *Season of Ripening*—It matures in March and April, and keeps in ordinary fruit stores until June-August. It is a good dessert or kitchen apple, and fair for export, though any bruises are readily and quickly noticeable when it is unpacked. *Origin*—A very old English variety, said by Dr. Hogg to be recorded as having been grown during the 16th century (1580) in Essex.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, January 8th, there being present Mr. A. M. Dawkins (Chairman), Col. Rowell, C.B., Messrs. C. J. Valentine, C. J. Tuckwell, C. E. Birks, G. F. Cleland, G. R. Laffer, and F. Coleman, Professor Perkins, and G. G. Nicholls (Secretary).

Owing to the fact that most of the Bureau Branches had been busy with harvesting operations, there was little business from that direction to be dealt with.

Membership.—The Minister of Agriculture, in reply to the Board's recommendation, stated that both he and the Commissioner of Crown Lands considered it inadvisable to appoint Messrs. G. Quinn (Chief Horticulturist) and W. Gill (Conservator of Forests) as members, as it would be unwise to have too many Government officers on the Advisory Board.

Shell Sand.—The Secretary reported that the shell sand from hundred of Perlubie, forwarded by the courtesy of Mr. J. Thomas, had been analysed and showed a percentage of 41.6 per cent. of lime (calcium oxide), equivalent to 74.2 per cent. calcium carbonate.

Sale of Wheat by Load Over Weighbridge.—A letter was received from the Secretary of the Chamber of Commerce, in reply to the Board's inquiries, as follows :—" I am directed by my Council to inform you that in consequence of the number of centres in this State, other than railway stations, at which wheat is purchased, and in view of the unfavorable reports received from the eastern States, where the proposed system is now in use, my Council are of opinion that your proposal of weighing wheat by load over weighbridge would be impracticable. They further desire to point out that the present method of weighing wheat by single bag is found by traders and others interested to work most satisfactorily, and gives uniformity of custom throughout the whole of the State." It was decided that the Secretary should ascertain the opinion of producers and buyers of wheat in New South Wales respecting the success or otherwise of the system of marketing by the load in that State.

Ridley Memorial Scholarship. - The Secretary reported that the Council of the Adelaide University had been requested to appoint one of the three trustees to administer the fund now available by a donation from clients of Mr. F. J. Fisher of £1,000 and of a similar sum from the Government. Nominations were then received for the trustee to be elected by the Advisory Board for the ensuing year, and Mr. A. M. Dawkins, being the only nominee, was declared elected.

Reduction in Width of Three-chain Roads.—The Secretary reported that under the Act of 1884 the district councils had the power of closing roads or portions of roads, and of disposing of the land thus made available to the holders of adjoining property, and that the Branch of the Bureau which had been making inquiries had been advised accordingly.

New Members.—The following gentlemen were approved as members of the undermentioned Branches :—Sutherlands—J. Badge, A. M. Twartz, jun., B. Mibus, G. Polst ; Tatiara—J. Hay, H. Weston, G. Webb, R. Miles, P. Marshall, J. Warnecken, W. J. Harvey ; Berri—W. Fiedler, C. Harris, H. Digby, M. Mahony, W. Napier ; Coorabie—B. Giles ; Monteith—G. Fraser, S. Smith, W. J. McCulloch, J. Fletcher, J. Rowan, jun., T. E. Kirby, T. Rice ; Renmark—G. Agars, E. Morley-Taylor ; Meningie—W. Goldfinch, W. M. Wright, J. R. Carter ; Clanfield—W. J. Booth ; Forest Range—J. Vickers, A. Green, F. Green ; Glencoe—G. E. Copping, P. Clifford ; Mangalo—A. G. Burton, H. S. Mackley, J. H. Cleave, J. C. Busch, S. Burton, J. W. Deer, C. H. Klingberg, E. P. Smith, C. Scott, R. Wright, W. Waters, B. McMartin, J. Meiglich, M. Burton, R. Collins.

THE WHEAT MARKET.

During the greater part of last month the local wheat market was somewhat irregular, there being on some occasions a difference of over a penny per bushel in the rates quoted by buyers.

Under date London, January 3rd, *Beerbohm's Corn Trade List* stated in regard to the European wheat position :—"There is no particular change in the general situation. There is probably more wheat in the world than in the early part of January in any previous year, but, so far as importing countries are concerned, the quality of much of the wheat is inferior. On the other hand the quality of the American and Canadian spring wheat is very much better than in the previous season, and unless the weather becomes very bad indeed, the quality of the Argentine wheat will also be appreciably better than in 1911-12, and the average weight per bushel about 3lbs. heavier. Climatic conditions in Europe since harvest time have been mostly unfavorable for threshing, being mild and damp, but it would not be at all surprising if we soon have a spell of dry and colder weather, which, besides being favorable for the autumn-sown wheat, would improve the condition of the wheat remaining over from the last crop."

About the same date Broomhall, in the *Liverpool Corn Trade News*, remarked :—"With regard to the immediate future of the market a great deal is likely to hang upon the rate at which the Argentine wheat shipments are made and when they commence. There will certainly be a sharp competition with the shippers of oats and linseed for tonnage during the first three months of the year, and later on the competition will be still more severe when maize reaches the seaboard in large quantities towards the end of April. When Argentina and Australia get into full swing, there is the possibility of wheat shipments running between 800,000 and 1,000,000 quarters per week, and keeping at this figure for many weeks. In ordinary years this would no doubt be an overwhelming quantity, when taken in addition to 5/600,000 quarters per week from North America plus about 300,000 quarters from South-East Europe and India, but in view of the undoubtedly large requirements of Europe this season, owing to the absence of suitable native qualities, it is quite possible that the wheat may be taken care of without great difficulty. The wheat will not only go into consumption freely and at once, but millers and merchants may acquire and hold considerable quantities in store and afloat in the anticipation of any spring crop scares, especially if, as seems likely, the Argentine wheat proves to be of really good quality. Even German millers may take liberal quantities of Argentine for mixing purposes if of good quality, and if prices be moderate. These big quantities of grain and seed being shipped from the Argentine will tend to keep freights at a high level, and consequently militate against a decline of the c.i.f. price."

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Jan. 6	—	3/6 to 3/7	3/6 to 3/6½	3/6 to 3/6½
7	Firm, with fair inquiry, Jan. 4/9½; Liverpool firm, fair inquiry, Dec.-Jan., 4/8½	3/6 to 3/6½	Do.	Do.
8	Firm, held for 3d. advance, Jan.-Feb., sailer, 4/8½; steamer, 4/9½; Liverpool rather dearer, Jan.-Feb., 4/8	Do.	Do.	Do.
9	Firm, but quiet; Jan.-Feb., 4/8½	3/5 to 3/6	Do.	Do.
10	Firm, to arrive 4/8½; Liverpool firm, quiet	Do.	Do.	Do.
11	Quiet; Liverpool firm, fair inquiry	Do.	Do.	Do.
12	—	3/5 to 3/6½	3/6½	3/6½
13	Quiet; Liverpool steady but quiet	3/5½ to 3/6½	3/6 to 3/6½	Do.
14	Firm, but quiet; Liverpool very firm	3/6 to 3/6½	Do.	Do.
15	Steady; Liverpool firm; Dec.-Jan., 4/9½; Australian new crop loading, 4/8½	3/6 to 3/6½	Do.	Do.
16	Firm, rather dearer; Liverpool firm at full rates, inactive	3/6 to 3/7	Do.	Do.
17	Steady, but quiet	Do.	Do.	Do.
18	—	Do.	Do.	Do.
20	Dull, easier tendency; Liverpool quiet	Do.	Do.	Do.
21	Do.	3/5½ to 3/6½	Do.	Do.
22	Do.	3/5 to 3/6	3/6	3/6
23	Dull	Do.	3/6 to 3/6½	3/6 to 3/6½
24	Very dull	Do.	Do.	Do.
25	—	3/5 to 3/6½	Do.	Do.
27	Easier tendency; Liverpool very dull	3/5½ to 3/6	3/6	3/6
28	—	Do.	Do.	Do.
29	Very dull, lower to sell; Liverpool dull, offered lower	Do.	Do.	Do.
30	Dull; Liverpool quiet	Do.	Do.	Do.
31	Steady but quiet; Liverpool quiet	Do.	Do.	Do.
Feb. 1	—	Do.	Do.	Do.
3	Steady but quiet; Jan.-Feb., 4/9½; Liverpool steady	Do.	3/6 to 3/6½	3/6 to 3/6½
4	Do. Liverpool improved demand, Jan.-Feb., sailer, 4/8½	Do.	Do.	Do.
5	Firmly held full rates; Liverpool firm, held for higher, but closing quieter	Do.	3/6 to 3/6½	Do.
6	—	Do.	Do.	Do.

STEAMER FREIGHTS.—(February 1st)—Steamers from South Australia to United Kingdom-Continent, full cargo rates, 40s. per ton (1s. 0½d. per bushel; to South Africa, 31s. 3d. per ton (10d. per bushel). Parcels, Port Adelaide to London, Liverpool, or Continent, 37s. 6d. per ton (11½d. per bushel); Port Adelaide to Melbourne, 8s. per ton (2½d. per bushel); to Sydney, 10s. 6d. per ton (3½d. per bushel).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent, 35s. to 37s. 6d. per ton according to size and position (11½d. to 11¾d. per bushel); to South Africa, 30s. per ton (9½d. per bushel).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Department reports on February 3rd—

BUTTER FACTORY.

There is, owing to the general mildness of the summer, still a good supply of cream coming in, but notwithstanding there is a shortage of that suitable for the top grades. The demand for butter keeps good. There is no alteration in prices, which are—Superfine, 1s. 2d. per pound; pure creamery, 1s. 1d. per pound.

A. W. Sandford & Co., Limited, report on February 1st—

BUTTER.—The month of January was on the whole fairly warm, though no prolonged spells of heat were recorded. Production has not decreased very rapidly on account of the late rains experienced towards the end of 1912. Best factory and creamery butter fresh in prints sold at from 1s. to 1s. 2d. per pound; choice separators and dairies, 10d. to 11d.; store and collectors, 7½d. to 8½d.

EGGS.—The demand is not now so great, and values are 10d. per dozen for guaranteed new-laid hen, and 10½d. for duck, with good clearances.

CHEESE.—There is no alteration to report in rates for the month, the supply being equal to the demand. Very matured lines are a shade easier, owing to consignments of new make now coming along being more matured. Present quotations are—6d. to 6½d. per pound for large to loaf; matured, 9d.

BACON.—Prices have improved about 1d. a pound, in consequence of the scarcity of the live hog. Importations have, however, helped to make up the deficiency. Best factory-cured sides, 10½d. to 11½d. per pound; hams, 1s. to 1s. 2d.

HONEY.—The weather has been most favorable for the flow of honey, resulting in heavy quantities coming forward, with the market a little easier. Prime clear extracted is selling at from 2½d. to 3d. per pound.

ALMONDS.—Last season's have been cleared, and already buyers are asking quotations for the new crop. Brandis, 5½d.; mixed soft shells, 5½d.; kernels, very scarce, at 1s. 3½d.

LIVE POULTRY.—Usually January is a quiet month for sales of live poultry, but this month has been an exception to the rule, buyers finding difficulty in securing anything like their wants. As a result satisfactory values have ruled, especially for quality lots. Good table roosters realised from 3s. 6d. to 4s. each; nice-conditioned cockerels, 2s. to 2s. 6d.; hens, 1s. 9d. to 2s. 4d.; ducks, 1s. 9d. to 2s. 6d.; geese, 3s. 9d. to 4s. 6d.; pigeons, 6d. to 7d.; turkeys, from 8d. to 1s. per pound live weight for medium to prime table birds.

POTATOES AND ONIONS.—During the past month deliveries of both potatoes and onions have been very heavy, and in consequence prices have fallen to a level that must be exceedingly unprofitable to the grower. The Adelaide market has been supplied almost exclusively from local sources, and although the early Gambier and Victorian crops are now available, it is unlikely that there will be much demand for them during the coming month. Quotations—Potatoes—New locals, £4 to £5 per ton on trucks, Adelaide or Port. Onions—Gambiers, £3 to £4 per ton on trucks, Adelaide or Port.

RAINFALL TABLE.

The following table shows the rainfall for January, 1913, at the undermentioned stations, also the average rainfall for January, and the rainfall for January, 1912 respectively:—

Station.	For Jan. 1913.	Average for Jan.	For Jan. 1912.	Station.	For Jan. 1913.	Average for Jan.	For Jan. 1912.
Adelaide	0-19	0-85	0-21	Hamley Bridge	0-10	0-97	0-18
Hawker	—	0-58	—	Kapunda	0-10	0-91	0-10
Cradock	—	0-65	—	Freeling	0-05	0-93	0-06
Wilson	—	0-71	—	Stockwell	0-15	0-84	0-04
Gordon	0-03	0-29	—	Nuriootpa	0-08	0-89	0-07
Quorn	0-25	0-65	—	Angaston	0-07	0-84	0-03
Port Augusta	0-14	0-55	—	Tanunda	0-08	0-91	0-10
Port Germein	0-12	0-73	0-02	Lyndoch	—	0-91	—
Port Pirie	0-14	0-83	—	Mallala	0-12	0-98	0-17
Crystal Brook	0-09	0-70	0-19	Roseworthy	0-13	0-87	0-25
Port Broughton	0-01	0-27	0-13	Gawler	0-08	0-79	0-17
Bute	0-19	0-83	—	Smithfield	0-03	0-77	0-09
Hammond	0-47	0-70	0-03	Two Wells	0-02	0-90	—
Bruce	0-17	0-27	—	Virgina	0-02	0-91	0-10
Wilmington	0-44	0-83	0-05	Salisbury	0-08	0-85	0-21
Melrose	0-13	1-33	0-03	Teatree Gully	0-05	1-14	0-30
Booleroo Centre	0-27	0-90	0-14	Magill	0-19	1-04	0-34
Wirrabara	0-30	0-68	0-08	Mitcham	0-16	1-01	0-09
Appila	0-18	0-67	0-06	Crafrers	0-29	1-79	0-38
Laura	0-06	0-71	0-16	Clarendon	0-40	1-31	0-16
Caltowie	0-20	0-70	0-17	Morphett Vale	0-16	1-06	0-14
Jamestown	0-07	0-69	0-20	Noarlunga	0-10	0-76	0-02
Gladstone	0-02	0-66	—	Willunga	0-18	0-86	0-07
Georgetown	0-05	0-71	0-41	Aldinga	0-17	0-77	0-03
Narridy	0-05	0-66	0-26	Normanville	0-16	0-67	0-04
Redhill	0-06	0-60	0-12	Yankalilla	0-28	0-71	0-04
Koolunga	0-06	0-69	0-12	Eudunda	0-23	0-88	0-09
Carrieton	0-17	0-74	0-09	Sutherlands	0-23	—	0-01
Eurelia	0-28	0-74	0-08	Truro	0-28	0-82	0-06
Johnsburg	0-14	0-52	—	Palmer	0-02	—	0-08
Orroroo	0-35	1-13	0-08	Mount Pleasant ..	0-03	0-89	0-14
Black Rock	0-47	0-71	0-01	Blumberg	0-05	1-37	0-12
Petersburg	0-16	0-89	0-06	Gumeracha	0-07	1-18	0-22
Yongala	0-15	0-69	0-11	Lobethal	0-18	1-22	0-17
Terowie	0-09	0-74	0-08	Woodside	0-18	1-18	0-22
Yarcowie	0-04	0-61	—	Hahndorf	0-21	1-26	0-20
Hallett	—	0-80	0-12	Narine	0-20	1-20	0-15
Mount Bryan	—	0-34	0-12	Mount Barker	0-21	1-12	0-15
Burra	0-07	0-80	0-14	Echunga	0-27	1-28	0-14
Snowtown	0-03	0-76	—	Macclesfield	0-24	1-12	0-06
Brinkworth	0-05	0-47	—	Meadows	0-25	1-35	0-04
Blyth	—	0-79	0-06	Strathalbyn	0-28	0-79	0-07
Clare	0-01	0-97	0-14	Callington	0-12	0-93	0-02
Mintaro Central	—	0-65	0-12	Langhorne's Bridge	0-12	0-59	0-10
Watervale	0-04	1-03	0-18	Milang	0-13	0-84	0-08
Auburn	0-04	1-12	0-12	Walleraro	0-02	0-64	0-06
Manoora	0-03	0-63	0-19	Kadina	0-09	0-61	0-02
Hoyleton	0-12	0-94	0-03	Moonta	0-04	0-60	—
Balaklava	0-20	0-86	—	Green's Plains	0-12	0-67	0-02
Port Wakefield	0-13	0-65	0-02	Maitland	0-08	0-68	0-03
Saddleworth	0-18	0-86	0-13	Ardrossan	0-03	0-61	0-03
Marrabel	0-17	0-86	0-11	Port Victoria	0-11	0-53	0-03
Riverton	0-29	0-80	0-17	Curramulka	0-15	0-78	—
Tarlee	0-13	0-89	0-19	Minlaton	0-10	0-58	—
Stockport	0-15	0-96	0-10	Stansbury	0-07	0-75	0-05

RAINFALL TABLE—*continued*.

Station.	For Jan. 1913.	A'v'ge. for Jan.	For Jan. 1912.	Station.	For Jan. 1913.	A'v'ge. for Jan.	For Jan. 1912.
Warooka	0-01	0-51	—	Bordertown	0-08	0-94	0-07
Yorke town	0-06	0-59	—	Wolseley	0-05	0-75	0-05
Edithburgh	0-01	0-58	0-06	Frances	0-42	0-91	0-04
Fowler's Bay	0-06	0-49	—	Naracoorte	0-30	0-92	0-08
Streaky Bay	—	0-54	—	Lucindale	0-21	0-89	0-05
Port Elliston	0-08	0-47	—	Penola	0-31	1-18	0-11
Port Lincoln	0-14	0-69	0-02	Millicent	0-77	1-14	0-02
Cowell	—	0-51	—	Mount Gambier ...	0-48	1-58	0-07
Queenscliffe	0-67	0-52	—	Wellington	0-08	0-98	0-08
Port Elliot	0-27	0-78	0-09	Murray Bridge	0-05	0-81	0-09
Goolwa	0-31	0-74	0-19	Mannum	—	0-55	0-01
Meningie	0-23	0-75	0-03	Morgan	—	0-57	—
Kingston	0-29	0-87	0-08	Overland Corner ...	—	0-59	0-02
Robe	0-56	0-88	0-10	Renmark	—	0-53	0-13
Beachport	0-43	1-13	0-05	Lameroo	0-07	—	0-01
Coonalpyn	0-17	0-86	0-03				

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of over 6,000 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

SILAGE AS FEED FOR DAIRY COWS.

By GUY S. ELLIS, in *The Breeders' Gazette*.

Silage is fast changing the methods of feeding all classes of livestock. First a feed for dairy cows its use has spread, until now the up-to-date beef producer will not attempt to feed without plenty of silage on hand. Silage has also formed a part of the winter ration for horses, and the shepherd is beginning to see the possibilities of silage in his feeding operations. It also has all the properties which are desirable in a feed. It is cheap, very palatable, succulent, bulky, and can be universally produced throughout the greater portion of the United States.

One of the chief advantages of silage feeding is the cheapening of the ration of the dairy cow. This is brought about by the large amounts of silage which are usually fed per cow taking the place of timothy hay, corn stover or fodder, all of which are relatively higher in price and are wasted more than in the case of silage. The succulent silage is much more desirable than the dry, woody butts of the fodder or than the timothy hay with its large amount of crude fibre.

Three Missouri farmers, writing to their experiment station, express the sentiment which is always prevalent where silage has been used, as follows :—
“ I am satisfied that the increase of production of milk and cream has paid for my silo this year. My cows have milked the past winter just as if they were on grass.” “ Silage saves one-half in the feed-store bills and over one-half in the amount of hay eaten.” “ I find silage excellent for dairy cows. Our cows milk as well in winter as they do in summer ; in fact, they usually gain when we commence to feed.”

Where attention is given to the balanced ration or to the supplying of the required amount of nutrients to maintain the body and provide for the production of milk, silage may also cut down the expense for grain. This may be done by adopting a rule used by many successful dairymen, namely, to feed practically all the roughage, such as clover or alfalfa hay or silage the cow will eat, and then supply the remainder of the required nutrients in grains or concentrates. Up to a certain point, depending upon whether the production is extremely heavy or not, the more silage a cow will eat the less amount of grain it will be necessary to feed.

Besides the cost of the ration being reduced there is also a reduction in the cost of producing a given amount of butter-fat. This is well illustrated by two herds whose records were obtained from one of the co-operative

cow test associations in operation in Iowa last year. These two herds were chosen for comparison because the average butter-fat production was more nearly equal than of any other herds in the association, and because one herd was fed silage and the other was not. The cost of roughage and of grain and the cost to produce 1lb. of butter-fat were all lower in the case of the silage-fed cows than in the case of those not fed silage. There was over 4 cents difference in the cost of producing 1lb. of butter-fat between the silage-fed herd and the herd not fed silage, and this is an important item, especially when the herd contains 10 to 15 cows or more. Butter-fat usually averages around 30 cents per pound, and when 4 cents are deducted the profits on a large herd will be reduced considerably.

In another test where 248 cows, representing 18 herds, were fed silage, while 125 cows, representing seven herds, were not fed silage, regardless of breed, age, or period of lactation, the silage-fed cows produced on an average 5.9 per cent. more milk and 7.8 per cent. more fat.

At the Vermont Station 24,858lbs. of green fodder corn was converted into silage and fed with a uniform daily allowance of hay and grain, and produced 11 per cent. more milk than when the same amount of green fodder corn was dried and fed with the same daily ration of hay and grain. At the Wisconsin Station 24,440lbs. of silage were obtained from 29,800lbs. of green fodder and was fed with 1,648lbs. of hay and 2,884lbs. of grain, while 7,330lbs. of field-cured fodder corn were obtained from 29,800lbs. of green fodder and was fed with 1,567lbs. of hay and 2,743lbs. of grain. The silage ration yielded 5 per cent. more milk and 6 per cent. more butter-fat.

Where silage is used, the roughage is handy and there is no hitching up the wagon and going to the furthest corner of the farm for a jag of corn fodder or a little timothy hay. This one factor must be considered, however, that silage is succulent and more like grass than any other kind of feed. It is, therefore, necessary to furnish the herd with warm quarters during the winter, as no one would ever think of combining a summer feed with winter weather and expect satisfactory results in the dairy.

Silage left over from the winter may be used to advantage in summer during the usual shortage of pasture. Silage in summer is also a great help, as it is always ready to feed, no matter how busy the season or the work. It is also relished by the cows, no matter how much other feed is on hand. Silage also has an advantage over soiling crops in that less space is necessary to furnish a given amount of feed and there is not the work connected with its use as there is with the getting ready of the soiling crops every day or two. Silage spoils more in summer than in winter, but where the silo is limited in diameter so that about 2in. of the surface mass may be removed daily there will be but a very slight amount of waste.

Only 50 cub. ft. are required for a ton of silage, while for hay it requires about 10 times as much space. At the same time it costs less to put up silage

than it does hay. Prof. Haecker, formerly of Nebraska, estimates the cost of putting up silage at 63 cents per ton, while hay costs \$1.50. Prof. King, of Wisconsin, in getting data from a number of farms, found the average cost of silage to be 73 cents per ton. At the Iowa Station it has cost from 60 cents to 75 cents per ton to fill silos during the past eight years; that is, cutting the corn in the field, hauling it, putting it through the silage cutter, tramping, levelling, and covering the silage. Prof. Woll, of Wisconsin, places the cost of silage at \$1 to \$1.50 per ton, including cost of seed, the preparation of the land, the interest on the investment, cultivation, cutting, and filling the silo.

The advantages of silage feeding might be summed up as follows:—Silage keeps young stock thrifty and growing all winter. It enables the cow to produce milk and butter-fat more economically. It increases the proportion of milk and butter-fat. Silage is more easily handled than dry fodder. The silo makes use of the cornstalks which would otherwise not be eaten and preserves them in a palatable form. More stock can be kept on a given number of acres. It is the most economical method of supplying feed for the stock during the hot, dry periods of summer when the pastures are short. The field is in good condition for fall cultivation after the corn has been removed. Silage does not deteriorate in palatability as does corn stover late in the spring. Less loss results in unfavorable seasons where the crop does not mature completely, as the corn may be used for silage to good advantage even if it is not thoroughly matured.



AGRICULTURAL BUREAU REPORTS.

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Angaston	*	15	22	Hooper	*	—	—
Appila-Yarrowie	*	—	—	Ironbank	†	21	21
Arden Vale & Wyacca	*	—	—	Julia	*	—	—
Arthurton	*	—	—	Kadina	*	19	18
Balaklava	*	—	—	Kalangadoo	*	8	8
Beetaloo Valley	*	—	—	Kanmantoo	819	15	22
Belalie North	*	15	22	Keith	*	22	22
Berri	814	22	22	Kingscote	*	4	4
Blackwood	816	3	3	Kingston	*	22	23
Blyth	809	15	15	Koppio	*	—	—
Bowhill	*	—	—	Kybybolite	*	20	20
Bowmans	*	20	20	Lameroo	*	—	—
Burra	*	—	—	Leighton	*	—	—
Bute	*	—	—	Lipson	*	—	—
Butler	*	—	—	Longwood	820	19	19
Caltowie	*	15	22	Lucindale	*	22	22
Carrieton	*	20	20	Lyndoch	*	—	—
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Colton	*	22	22	Mannum	*	22	29
Coomooroo	*	—	—	Meadows	821	17	17
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Coorabie	811	—	—	Millicent	*	11	11
Cradoek	†	—	—	Miltalie	813	15	22
Crystal Brook	*	—	—	Minlaton	†	20	20
Davenport	*	—	—	Mitshell	*	22	22
Dawson	*	—	—	Monarto South	†	22	—
Dingabledinga	*	14	14	Monteith	*	—	—
Dowlingville	*	—	—	Moonta	*	—	—
Elbow Hill	*	—	—	Moorlands	*	—	—
Forest Range	817	20	20	Morchard	*	—	—
Forster	*	—	—	Morgan	*	—	—
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Parilla Well	*	—	—	Sutherlands	*	—	22
Parrakie	*	1	1	Tatiara	*	1	1
Paakeville	*	20	20	Tintinara	*	—	—
Penola	824	1	1	Uraidla and Summert'n	*	3	3
Penong	*	8	8	Utera Plains	*	15	22
Petina	*	—	—	Waikerie	*	—	—
Pine Forest	*	18	18	Warcowie	*	—	—
Pinnaroo	*	—	—	Watervale	*	—	—
Port Broughton	807-8	21	21	Wepowie	*	—	—
Port Elliot	822	15	15	Whyte-Yarcowie....	*	—	—
Port Germein	*	—	—	Wilkawatt	*	—	—
Port Pirie	†	1	1	Willowie	*	7	14
Quorn	†	15	—	Willunga	*	1	1
Redhill	*	18	18	Wilmington	807	19	19
Renmark	*	—	—	Wirrabara	†	—	—
Riverton	*	—	—	Wirrega	*	—	—
Saddleworth	*	21	21	Woodside	*	—	—
Salisbury	*	4	4	Yabmana	*	—	—
Shannon	*	—	—	Yadnarie	*	15	22
Sherlock	*	—	—	Yallunda	813	—	—
Spalding	*	—	—	Yongala Vale	*	15	22
Stockport	*	—	—	Yorketown	*	8	8

* No report received during the month of January.

† Formal report only received.

ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—
March 12th, April 9th.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Hookina, January 21.

(Average annual rainfall, —in.)

PRESENT.—Messrs. J. Henschke (chair), P. and T. Kelly, J. Carn, L. Woods A. Henschke, and S. Stone (Hon. Sec.).

DESTRUCTION OF RABBITS.—In discussing this subject Mr. Kelly said he favored "Lazemout" for dealing with the pest. Mr. Carn considered this method fairly reliable in the winter months, when the rabbits were scarce and kept to their burrows, but when they were plentiful and scattered it was useless. Members thought the treatment of each individual burrow would need considerable time, and believed the poison cart was more expeditious and would give better results where large areas were to be dealt with.

Mount Remarkable, January 22.

(Average annual rainfall, 21in.)

PRESENT.—Messrs. N. S. Giles (chair), L. A. Bauer, T. H. Casley, W. Foot, M. G. Giles, W. Oldland, E. M. Willington, E. B. Andrews, W. Smith, jun., E. Mayne, and H. H. Davie (Hon. Sec.).

HARVESTER *versus* STRIPPER.—Mr. T. H. Casley read a paper on this subject in which he advocated the use of the complete harvester. After seven years use of the harvester he would under no consideration revert to the old style of stripping and winnowing wheat. There was no foundation for the contention that the harvester was too heavy and complicated to drag round the paddocks. Four horses would draw this machine quite as easily as three could draw the stripper. He had never seen a crop on land so steep that the harvester could not take it off, and in his experience very little wheat was lost over the tail of the sieves. Although the machine was more complicated than the stripper, the ordinary farm hand should be able to manage it. Neglect to overhaul the machine occasionally was responsible for a large number of delays, and with ordinary care and intelligence these delays could be obviated. The machine made an excellent sample, and the method of filling the bags was much superior to the old style. The bags could be left open for days before being sown up to give the grain a chance to dry. Cocky chaff could be saved with the harvester, but he doubted very much the wisdom of this course. Only with the addition of bran, pollard, or crushed wheat, &c., could cocky chaff be made a good feed. The harvester enabled the farmer to market his wheat earlier, there was no cocky chaff to clear up, and in his opinion both time and labor were saved. The stripper, however, was not to be despised, and in some newly-opened country it would be used for

some time to come. The great disadvantage with this means of harvesting was the monotonous toil of winnowing, and even then the sample secured was not always up to that obtained from the harvester. Motor winnowers were tried, but in his opinion they were most unsatisfactory. In discussing the matter Mr. Oldland said that the sample secured depended very largely on the way in which the harvester was managed. With a damp-weather stripper he found it possible to get a really good sample of grain, but for quickness and efficiency he favored the harvester. Mr. N. S. Giles, who was a pioneer in the use of the harvester in the district, expressed an opinion in support of the stripper, because so much harm was done by the harvester being improperly used. The wheat was hurried off before it was properly aired or dried, with the result that weevil appeared, and it was placed on the home markets in an unsound condition. In addition, the harvesters spread the seeds of weeds over the land. Mr. L. A. Bauer said that whilst cocky chaff could be profitably utilised in a bad season, in ordinary seasons there was a good deal of trouble occasioned, first in stacking, and then carting it, and spreading it. Even then it was not distributed as evenly as it was by the harvester. Weeds could be killed by the cultivators after the first rains. Mr. W. Smith, jun., favored the use of the harvester. He thought there was a better chance of the wheat being thoroughly aired in the bag than in the centre of a big heap. A sample of wheat he had secured from the harvester was 23bush. over weight in 80 bags, whilst from the stripper the overweight was only 10bush. The Chairman considered the results from the harvester depended entirely on the driver. For hilly country, however, he thought the stripper the better machine. In reply, Mr. Casley said that annually he had stacked from 40 to 60 bags of seed direct from the harvester, and in no case had he been troubled with weevil. If he wanted a first-class sample he found it necessary to go through the crop and take out foreign plants by hand. If graders were utilised and the land were kept clean less would be heard of green or imperfect wheat.

THE DAIRYING INDUSTRY.—The Government Dairy Expert (Mr. P. H. Suter) delivered an instructive address on the dairying industry and the breeding and feeding of cows. At the close of his address he answered numerous questions relative to his subject.

Orroroo, January 18.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. M. W. Forester (chair), R. C. Sharp, L. Haynes, E. Langton, C. R. Macdonald, H. J. Cottrell, S. Hook, J. C. Hagger, A. L. Brice (Hon. Sec.), and one visitor.

POULTRY ON THE FARM.—In a paper on this subject Mr. J. C. Hagger stated that in the majority of cases where fowls were kept on farms they had to take care of themselves. Frequently the best laying birds were secured by foxes and other pests, and, of course, the old hens were not profitable. Where foxes were troublesome, he advocated the erection of fences around the yards 6ft. high and of 1½in. mesh wire netting. If it were desired that the fowls should have the run of the farm during the daytime they could be let out, but they should be fed in the yards to avoid difficulty in getting them back at night. A good roost could be made from four lengths of ½in. piping 2ft. 9in. long, with four tied cups dropped in the piping, 2in. x 1in. straight timber being used for perches. The house itself was best made of curved iron, the sheets being bolted together on an iron frame with six legs. It should be high enough for a person to comfortably stand in. The perches should be movable. The floor should be made of well rammed earth raised a few inches with wood ashes spread on the top. These would absorb the droppings, and could be cleaned out, say, once a week. Wherever practicable the house should be erected on the shady side of a tree, or, what was better, shade could be provided by nailing the ends of a case together, forming a shelter like an inverted V, and the ground should be forked up underneath and kept moist in summer and dry in winter for a dust bath to keep the birds free from lice, &c. For egg production White Leghorns were the best breed. Black Orpingtons and Plymouth Rocks were good allround birds, and the Indian Game were specially suitable for table purposes. No breed kept under insanitary conditions and badly fed could be expected to do well. To secure hens that would lay in the winter months it was a good plan to invest in an incubator. The early chickens would soon return more than the cost of this. Weakly chickens should be culled out, and any that had a tendency to laziness should be killed off. Old birds should be disposed of with the exception of a few two or three year old hens for breeding purposes. Regular feeding and clean drinking water kept in a cool shady place were essential. Tick could be eradicated by giving the woodwork a thorough flooding with boiling soap-suds and kerosine two or three times a week.

Wilmington, January 22.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. J. Hannagan (chair), A. Forbes, McGhee, Hill, R. B. Scholefield, J., W., and G. Schuppan, and B. Jericho (Hon. Sec.).

IMPLEMENTS AND CROPS.—Mr. McGhee read a paper, in which he said, "Economy is the main factor in farming. No farmer can afford to neglect his implements. A blacksmith's outfit costs only a few pounds, and one should be found on every farm. It enables the farmer who is at all handy to repair trifling breaks as soon as they are noticed. Time and money are lost in running to the nearest smith with broken implements and tools. On wet days swings, hooks, &c., can be made, and these are always a good asset. Sound sheds should be built for all machinery, especially for the binder. The harvesting of the wheat crop should be done as expeditiously as possible, because in five minutes hailstones will do more damage than would equal the cost of hiring an extra hand. I favor the complete harvester. The most critical time begins when the crop is ripe, and it should be got off as quickly as possible. With the harvester it can be marketed very expeditiously."

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

North Booborowie, November 25.

(Average annual rainfall, 16·2 in.)

PRESENT.—Messrs. Ashby (chair), Mayfield, Morgan, Phillips, Birks, Dunstan, Schaefer, Toll, W., A. S., and K. Phillips, and Simpson (Hon. Sec.).

THE EVOLUTION OF FARM MACHINERY—Mr. Michael Murphy, in an interesting paper, described the conditions under which the earliest settlers grew and marketed wheat. These were the days of the flail, the sickle, and the scythe. Roads or tracks were so bad that carting was an exceedingly difficult and tedious task. The invention of the Ridley reaper, he said, was the event which had saved the situation for South Australia as a wheat-producing State. Mr. W. R. Birks traced the evolution of the seed drill and other modern machines.

Port Broughton, January 17.

(Average annual rainfall, 14 in.)

PRESENT.—Messrs. B. Donnelly (chair), T. E. Pattingle, G. Routley, E. Allochurch, P. Wittaker, R. Hill, J. Barclay, and J. H. Fletcher (Hon. Sec.).

WHEAT.—The following paper was read by the Hon. Secretary:—"At the last meeting Mr. T. E. Pattingle showed how oats had invariably paid him better than wheat, but the demand for oats is very limited, and the price largely influenced by local requirements. With wheat, however, this is not the case, the value being fixed by the requirements of the world, which are practically unlimited. Hence wheat is the most important crop by far in the greater part of South Australia, if not in the whole Commonwealth. Wheat belongs to the natural order *Gramineæ*, which includes the true grasses. This order is divided into various species, and these again into sub-species. I shall only deal with the four "naked grained" sub-species, i.e., (1) *Triticum sativum*, our soft wheats; (2) *Triticum turgidum*, turgid wheats; (3) *Triticum durum*, flinty or macaroni wheats; (4) *Triticum Polonicum*, Polish wheats. *Triticum sativum* is the most important by far, as all our soft wheats come under this heading, and therefore is, so far as we are concerned, the only sub-species from which flour is made. *Triticum turgidum* is practically unknown in South Australia. An example of this is Galland's Hybrid or White Petanielle. All of these are bearded and the straw is equally solid. *Triticum durum* is chiefly grown in hot countries. If sown locally the wheats do not grow much in the winter but shoot up in the late spring. The only variety grown locally is Le Huguenot, and this is used exclusively for hay. One reason for the introduction of these wheats into Australia was their power of resistance to disease. However their slow growth in the winter is a disadvantage, as it allows the weeds to get a good start. The fourth, *Triticum Polonicum*

has no interest for us. To return to our soft wheats. In cold countries these are divided into winter and spring wheats, the time of sowing being late autumn and early spring respectively. The winter wheats germinate when sown, and during the cold winter months are covered with snow and simply stool. When the warm spring comes they shoot up into head. The spring wheats, on the other hand, are not sown until the warm weather. They germinate and shoot straight up into head, stooling only to a very slight degree. In South Australia we have a modification of these wheats in the form of early and late wheats, our early wheats being sown in the early winter until midwinter, instead of the spring time, and though the wheat is checked a little in the cold winter months, this is only so to a very slight degree compared with the above. Locally, however, we only grow early and midseason varieties. Different varieties were tested at the Roseworthy Agricultural College, and they were placed under these three headings, i.e., early, midseason, and late. Examples of early wheats are Gluyas, Carmichael's Eclipse, College Eclipse, Bearded Gluyas, Early Purple Straw, &c. Midseason—Viking, Fan, Marshall's No. 3, Federation, Wiltunga Wonder, Yandilla King, &c. Late—Noe, Cape wheat, Phyllis Marvel, and Bearded Reiti. Before selecting the varieties to sow, a farmer has many points to take into consideration, the following being prominent:—The distribution of rainfall and heat over the growing and ripening months. The character of the land with regard to moisture-holding capacity. The character and strength of growth of weeds, and the prevalence of frosts and north winds in the spring. Experience shows that Gluyas is one of, if not the best variety for local growth. It gets away well in the winter and outgrows the weeds (if they are not destroyed by late cultivation), ripens early in the spring, thereby suffering little from the disastrous north winds, and as a rule is not affected to the same extent as the later wheats by takeall. It is often caught by late frosts, which, however, are not a very serious factor in this district. It almost always gives the highest yield. It also makes very good hay. Its chief drawback is its liability to lodge. Late Gluyas selected at the Roseworthy College is receiving a good deal of attention locally this year and in most cases has beaten the ordinary early Gluyas. It is similar to the early Gluyas in many respects, but does not lodge to the same degree. It is about a week later in ripening, producing a very good grain. King's White also may be depended upon to give a fair yield in any year, but the beard is a big disadvantage, not only in the hay, but with harvesting machinery. The King's White grown by us this year gave a splendid sample, and was by far the best in this respect. This year the midseason wheats are turning out very well, as most of them caught the late spring rains. German Wonder (a locally selected wheat) is, as far as I am aware, topping the list of the midseasons locally this year. The sample is very good indeed where it has not been affected by bunt. Yandilla King, Marshall's No. 3, &c., all have their places and give good yields. As a rule, however, local conditions appear to favor the growth of the early varieties, but one would make a very serious mistake in growing early wheats exclusively, as they might all be caught by a late spring frost or ripen too early to get the benefit of late rains, as in this year; and moreover would all be ripe together, which would involve great risk of loss to the farmer." Mr. T. E. Pattingale agreed that it did not pay to sow early wheats exclusively, though they gave the heaviest yields as a rule here. A farmer should not jump to hasty conclusions in regard to new wheats. Some farmers on the Peninsula grew 30bush. of Federation in their first year. The next season they sowed a large area with the same variety, but it was nearly a failure. Mr. Hill considered Gluyas the best all-round wheat for the district. Mr. Barclay agreed that Gluyas was a very good wheat. It was largely grown along the coast, and in Wandearah it occupied first position, Carmichael's Eclipse coming second. Some people objected to Gluyas, as it lodged, and some to Carmichael's, as it was so tough to reap; but the modern harvester got over most of the difficulty in the latter regard. Gluyas, however, should not be sown early. A farmer locally sowed some between the 1st and 15th of April, and some again from the 1st to 7th of June, the soil being worked similarly and all other conditions being the same. That sown in April yielded 6bush. per acre, while that sown in June gave 18bush. He knew of other instances of a similar nature. In explanation Mr. Barclay said Gluyas, if sown too early, tended to shoot straight up into ear without stooling.

Port Broughton, November 22.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Donnelly (chair), Pattingale, jun., D. and E. Allechurh, Routley, Barclay, and Fletcher (Hon. Sec.).

ALGERIAN OATS AND WHEAT.—Mr. F. E. Pattingale had kept a careful record of the returns from crops of Algerian oats and wheat during the past three years. These were set out as follows in a paper read by him :—

Crop.	Super. Lbs. per Acre.	Seed. Lbs. per Acre.	Cost per Acre of Crop.	Yield per Acre.	Gross Value of Produce per Acre.	Net Return per Acre.	Land Treated.	Date of Drilling.
			£ s. d.	Bush.	£ s. d.	£ s. d.		
1909.								
Oats....	70	40	1 0 0	40	4 9 0	3 0 0	Fallow	.. Apl. 10
Wheat..	70	60	1 1 6	16	3 4 0	2 2 6	Fallow	.. Apl. 10 to May 11.
1910.								
Oats....	50	30	0 8 0	12	1 4 0	0 16 0	Fallow, 1909, burnt off and drilled	Mar. 8 to 11
Wheat..	80	60	0 15 0	4	0 15 4	0 0 4	Do. and ploughed and harrowed	June 6 to 11
1911.								
Oats....	112	40	0 19 0	26	3 5 0	2 6 0	Fallow	
Wheat..	112	60	1 1 6	10	1 19 2	0 17 8	Cultivated and harrowed ex- tra	

In 1909 the area of wheat planted was 294 acres, whereas only 6 acres of oats were put in. However, the oats occupied a strip of land along one side of the paddock, which was fairly representative of the whole block. The average of the wheat was somewhat affected by takeall; one piece of 90 acres averaged about 20 bush. per acre. In 1910 35 acres of oats and 50 acres of wheat were tried. In 1911 15 acres of each cereal were sown. In the case of the present season the wheat crop was showing much better than had been the case formerly, but the promise of the oats was disappointing. However, Mr. Pattingale recommended the growing of oats in larger quantities. They made excellent horsefeed, were readily saleable, and wherever takeall was troublesome, provided the best preventive measure known. While some varieties were supposed to shake out, he had not been troubled in this way with Algerian, although the stems often broke off at the first node. Smut was prevalent in dry seasons.

MOVEMENT OF SOIL MOISTURE.—Mr. Donnelly led a discussion on this subject. He showed the advantages of well-worked fallow by means of which the capillary tubes, which carried the moisture to the surface of the soil, whence it was evaporated, were broken up. The breaking of these tubes checked the evaporation, and the conserved moisture was of great assistance in connection with the nitrification of organic matter.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Blyth, January 18.

(Average annual rainfall, 26.28in.)

PRESENT.—Messrs. A. L. McEwin (chair), J. S. McEwin, A. V. Heynemann, C. H. Zweek, W. and J. Pratt, J. C. Schulze, A. A. Schulze, J. J. Clarke, W. J. Ninnies, F. T. Pedlar, T. Roberts, S. G. Shepherd, M. and T. Williams, J. B. and A. B. Kirchner, A. Hamilton, J. F. Bishop, H. Neumann, H. A. Montgomery, J. Koster, M. Vogt, J. Williams, F. C. Williams, H. W. Eime, W. O. Eime (Hon. Sec.), and 12 visitors,

BREAKING HORSES.—Mr. A. A. Schulze read a paper on this subject. Horses which had to do heavy work when young, he said, could not be expected to hold out as well as those that were only lightly worked. The coltbreaker could either make the animal he had to handle a good worker, a timid beast, or a stubborn jib. He did not approve of the practice of putting a young horse straight into a team without previously handling it. This usually resulted in stubbornness. Little better results were attained by lassoing the animal, putting the winkers on with the aid of a stick, and running it around on the end of a rope until it was exhausted, and then forcing it to draw a log, after which it was placed in a team. The most satisfactory means of colt-breaking was to quietly drive the animal into a strongly built stable, about 20ft. square, in the centre of which was a strong upright. After placing a rope over its neck with the aid of a pole, a turn of the rope should be taken around the upright, the end being held by an assistant whilst the colt was being drawn up to the centre. Then the winkers should be put on. A lengthy rope could be fastened to the ring of the bit on the near side, passed under the jaw, and tied to the ring on the offside. This would prevent the ring being pulled into the colt's mouth. The neck rope should then be taken off, and the animal led to a clear space, where it might be allowed to run around in a circle; but it should not be forced to do so. When it had been taught to follow the operator a rope should be fastened to the offside ring, and the animal driven. It should now be hitched by means of long chains to a light log. It was as well to accustom the animal to having its legs over the chains. It should be turned in every direction, and made to start and stop at the driver's command. It should by this time be quiet enough to be placed in the team, but not more than an hour or two hour's work should be given at first. A little more should be given each day until it was strong enough to do a day's work without distress. Breaking was best started when the animal was about 2½ years old, about a month before seeding being the most suitable period of the year. Not only was the quantity and quality of the feed given the colt to be considered, but attention should be paid to the manner in which it was given. Mr. Montgomery did not believe in breaking with an open bridle. Mr. Clarke thought a young horse would be generally too timid to start if put into harness by itself, and Mr. Hamilton advocated educating the animals from the time they were foals.

Freeling, November 22.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. T. Elix (chair), A. Mattiske, sen., Neindorf, A. Elix, Morris, Neldner, Heinrich, Savage, and G. A. Block (Hon. Sec.).

HARROWING GROWING CROPS.—Members all agreed that the practice of harrowing growing crops had proved beneficial in this district.

DRILLING SUPER. ON FALLOW IN SPRING.—The question of dressing the fallows with super. during the months of September and October was discussed. Members were divided in opinion as to whether the practice was profitable. Some considered that any advantage which would follow the wider distribution of the super. would be outweighed by the greater growth of weeds which would come up after a summer rain.

Freeling, January 17.

(Average annual rainfall, 17½in.)

PRESENT.—Messrs. A. Kuhlmann (chair), A. and G. F. Elix, F. H. Heinrich, H. Neindorf, H. Koch, E. Morris, M. Shanahan, H. Mattiske, J. and G. H. Block (Hon. Sec.).

BARLEY GROWING.—In a paper on this subject Mr. G. H. Block said—"The general idea of farmers not very many years ago was that this part had not sufficient rainfall to grow barley. They therefore put the barley in the ground early in the season, reasoning that it would ripen early and escape the heat of the summer; but results were poor. The barley would grow, but after a few hot days it would die off suddenly, and the heads, instead of turning a brownish-yellow color, would appear greenish-white. The next difficulty was stripping. The straw would be rotten, and it would be continually choking the comb, and when cleaned the grain would be very inferior. I always tried a little, but I could not get satisfactory results. I was advised by a friend to sow the seed at the end of May or the beginning of June on good fallow ground. I tried this and had another failure. I had determined, if possible, to grow a good crop, and sowed the seed on some of my best ground. The crop came on splendidly and there was every indication of a good return. However, when the grain began to fill the stalk was too weak to hold it

up, and a great part of it went flat on the ground, but that which I managed to get with the stripper was a nice plump grain, and gave every satisfaction. Next year I sowed some on a poorer class of ground, since when I have secured good crops. Although barley apparently did not require the best of ground I thought it should be fairly treated, and therefore never attempted to sow it where wheat had been a failure. However, I decided to give it a trial on the very poorest ground on my farm. On a slope there was a patch of about 15 acres, the appearance of which was not too bad; the top was sand and the bottom limestone gravel, and it worked up nice and loose. I top-dressed it with some manure and tried to grow wheat and then oats, but charlock was all that I got. When I reaped the few straggling heads of wheat standing out above the charlock I noticed that wherever a grain of barley had been dropped it had stood out well and had held its own. I followed up the paddock, and from that patch the following year I reaped over 30 bush. of malting barley, and there was no charlock to be seen. I secured just as much wheat and hay as was the case in other years and had the barley in addition. I have followed up this plan ever since, and barley-growing has been a great help to me in farming. I have only tried three varieties, viz., Cape, Chevalier Malting, and Prior Malting. I did very well with Cape, but the difficulty with this is that unless a good damp weather reaper or harvester is available it must be trodden out with horses. The market, too, is very uncertain. I have sold at as low as 7s. a bag (old standard). I would recommend anyone wishing to sow this kind of barley to get seed from the Roseworthy College. They call it Six-row Barley, and it is certainly an improvement on the original Cape. Professor Perkins showed me a patch which he thought would go over 50 bush. to the acre. The next class of barley I sowed was Chevalier Malting, with which I had good results, but I got the best results from Prior. This malting barley is about 6 in. shorter in the straw than the others. Like the Chevalier it stands up and yields well. It has a rather small grain but is very plump. Last year I reaped 15 bags to the acre, and it is now the favorite in the district. Barley seed should be pickled and sown late in May. Grain intended for malting should be cleaned well and kept free from dirt. No cracked grains should be included or maltsters will not buy it. Reap as soon as the crop is ready, as barley will easily discolor and the selling value will be reduced." In discussing the subject Mr. A. Kuhlmann was of opinion that barley took more nourishment out of the ground than oats or wheat. Mr. Neindorf had grown Prior malting barley on ploughed ground, and it gave very good returns. Good black Bay of Biscay soil should not be sown with barley. Mr. F. H. Heinrich intimated that he intended putting a hay stubble paddock under this crop next season.

Friedrichswalde, December 14.

(Average annual rainfall, 19 in.)

PRESENT.—Messrs. F. W. Duldig (chair), E. Duldig, P. Goodfellow, J. and F. Heintze, L. Johnson, J. P. Coombe (Hon. Sec.), and nine visitors.

SEED WHEAT.—In a short paper on this subject, Mr. J. Heintze said that wheat for seed should be selected from the best of the crop. When quite ripe, it should be reaped, cleaned, and carted without delay. If it were wet there was a danger of it malting. Every three or four years the seed should be changed, care being taken to secure wheat free from seeds of weeds. In reply to questions, Mr. Heintze said seed could be obtained by a farmer from any district where the rainfall was equal to his own. Other members supported this practice, but Mr. P. Goodfellow believed in changing from east to west.

WESTERN DISTRICT.

Coorable, December 21.

PRESENT.—Messrs. C. L. Giles (chair), Wheadon, Riddle, Atkins, Kingsley, N. Roberts, Baanett, C. Hobbs, Iles, Attick, Woodforde, Murray, Cousins, Evans, Jackson, Oats, Grimes, D. Roberts, Stretton, B. Giles, Grivell, H. Hobbs (Hon. Sec.), and 10 visitors.

HARVESTER v. STRIPPER AND WINNOWER.—A paper under this heading was read by Mr. V. S. Kingsley. "The question of placing his wheat on the market in a good saleable condition," he said, "is one of great importance to the farmer. In view of the high rates of wages prevailing it is policy to give serious consideration to all farm machinery that will save labor; consequently the complete harvester takes a front place. All the good points of the stripper have been embodied in the harvester, with the single addition of a small winnower and a box to carry the cleaned wheat. There are three distinct types of machines, viz., those with one thresher, those with two threshers, and the Canadian make. The former two are very similar in their details, except in their treatment of the "repeats." The first type tails its unthreshed pieces by means of an elevator, back again on to the first thresher, and so through again, until all is broken up. I do not favor this type at all, as a great deal of spitting is the result. Where the crop is short the comb is very low down—the throat very nearly straight up and down—and as the repeats are placed on the front side of the thresher some must fall down the throat. In fairness to this type, however, it must be said that in a crop of moderate height and weight this evil would not be so apparent. With the second type of harvester the unthreshed portions are tailed over the end of the sieves into the second thresher direct, and then the re-threshed heads are elevated again to the top sieve. Thus there is no danger of any of it being lost down the throat, as in the other machine. I decidedly prefer the belt drive wherever it is possible, and under no consideration would I have a spur drive for beaters. Belts have a nasty habit of slipping off at times, but that is their safety-valve, for in the event of sticks, wire, or other hard bodies entering the machine, the fact of the belt being able to slip will in many cases prevent any serious damage. The Canadian harvester seems to possess very many decided advantages. It enables the farmer to work on damp mornings, and right through the day until sundown. The whole machine is directly behind the horses, and so is much easier of draught. The only portion that is in the crop is a long extended arm which carries a slowly-revolving beater over a coarse stripper comb, with a knife working similarly to a mowing machine to cut off the heads. The width of crop cut by this type of machine is very much greater per horse than with any of the other types. My opinion is that the modern type of complete harvester is the best and most economical machine for the small farmer who expects to reap about 1,000 bags. It costs him only his own labor to harvest and put up his wheat into bags ready for market. The farmer with a stripper must engage men, or a cleaning gang, to deal with the wheat heap. The local price last season for hand cleaners was 5d. per bag; this would mean £20 16s. on 1,000 bags. The motor winnower is beyond the means of the small farmer, and its advantages over the hand winnower are small in comparison to its initial cost, and the wages and keep of men working. It threshes all the heads, but the harvester does that as well. It may also be argued that where the farmer has a motor winnower he can tear his wheat off as long as the comb of his strippers will take the crop. But the harvester does all this; consequently I do not regard the motor winnower as a serious competitor of the harvester. Cocky chaff is practically valueless as a feed in itself, and is really not worth serious consideration; but as it is a factor in the case, it is only fair to mention that perhaps it might save famished stock from starvation—but so would straw. With the harvester all the chaff is blown back to the land, and it serves a good purpose there as manure. The cost of cleaning 1,000 bags of wheat, viz., £20 16s., could be spent in hay; which should be grown on the farm. Under the circumstances its cost value will depend on the wheat average of the farm. If this is 10 bush. per acre, with wheat at 3s. per bushel, it means that he can mow about 10½ tons of hay from an average hay crop of three-quarters of a ton to the acre, without decreasing the net value of his wheat. Cocky chaff which has been saved has to be carted home, and there is a considerable loss of wheat, which cannot all be scooped up into the winnower. The cost of pollard, wheat, molasses, &c., to make the chaff up into fit feed must also be reckoned with, whereas, with the harvester, there is none of this labor involved. Further, the paddocks are immediately available for grazing. If a substitute for cocky chaff is needed I suggest raking up straw, which could be chaffed up and fed mixed with hay chaff. In any case, there is much more nutriment in the straw than in the husk. I look forward to the day when the motor harvester will be in the paddock; for it is absolutely certain that a motor-driven machine will result in far less accidents and breakages." Mr. W. H. Wheadon also read a paper on this subject. He said the stripper was more suitable for anyone farming on a large scale in this district, as on the majority of farms the haulage was heavy, and stones and stumps were encountered. Where the farmer was doing his own work on, say, 150 acres, the harvester, perhaps, was most suitable, but a 500-acre crop would require three strippers, and the men who drove the strippers could afterwards do the winnowing. Where the farmer had a motor winnower, three strippers and 10 horses

should easily account for 600 acres. Five horses and a competent man were required to manage a 5ft. harvester, but three horses and an intelligent boy could work a stripper. While grain could be reaped in damp weather, it was not advisable to allow damp corn to remain in a heap for any length of time. The saving of cocky chaff occasioned by the use of the stripper was a very important point in its favor. The harvesters were more wasteful, as not only was there leakage from the combs, but the riddles also would account for some loss. After making allowance for the extra wages demanded by the person who was competent to handle the harvester, the extra cost of horses, and horsefeed, there would be a considerable balance in favor of the stripper. The majority of members favored the use of the stripper. The disadvantages of the harvester were that the seeds of weeds were distributed over the land, there was a necessity of waiting for the crop to thoroughly ripen before it could be harvested, the loss of grain over the tail of the machine, the increased draught, and the complexity of the machine as a whole.

Miltalie, November 23.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. E. P. Smith (chair), A. R. S. Ramsay, J. P., J. W., and E. Story, P. G. Wilson, W. G. Smith, A. M. and M. H. Wilson, W. E. Hier (Hon. Sec.), and two visitors.

BUNT.—A paper on this subject, written by Mr. M. Searle, was read by Mr. M. D. Searle. The writer stated that during last season a number of farmers in this district had 6d. per bushel deducted from the market rate when selling their wheat on account of the presence of smut in the sample. Smut was a fungus which could only germinate if there were sufficient moisture, and after it had germinated, unless it had a young wheat seedling on which to feed, it died. He had made a practice of pickling with a solution of 1oz. of bluestone to a gallon of water, and the results had been very good. The grain required to be pickled at least a week before sowing, and if it were to be returned to the bags from which it was taken they also should be thoroughly wetted with the pickling solution and hung out to dry. The best method of ensuring every grain coming into contact with the solution was to pour the wheat into a vessel containing the pickle. The Secretary believed that using wheat that had been reaped before it had properly matured had a great deal to do with the crops being dirty, and any wheat that had shown signs of the disease should not be used for seed. A farmer in the district made it a practice to pickle his seed wheat just after harvest, and he had had no trouble with smut. Mr. P. G. Wilson had found that sowing wheat when it was wet resulted in a smutty crop. Mr. J. P. Story had, during the present season, seen heads of wheat the top half of which contained smut and the bottom clean grain. Other members had seen heads where one side was smutty and the other clean. [Mr. D. McAlpine, Vegetable Pathologist of Victoria, says in respect of ears of wheat partially bunted—"Under ordinary conditions the whole of the grains in an ear are affected, but in certain seasons it is not unusual to find ears in which some of the grains are bunted and others clean. It may be that one side of the ear has escaped, but usually the sound grains are interspersed among the bunted. In one particular case the lower grains were all bunted, then about the middle an occasional one was clean, and at the top both smutted and sound occurred, the topmost grain, however, being diseased. The normal condition is that all the grains in an ear are attacked, and when some escape it can only be owing to the spore-bearing hyphæ failing to reach these particular grains. It might be thought that the grains which escape the invasion of the fungus to form spores had some resisting power, but when the clean grains in a partially bunted ear were infected and sown they produced bunty plants, showing that there was nothing in the grain itself to account for its escape."—Ed.] Mr. H. R. Jacobs stated that seawater with bluestone had been used last season with very good results. The majority of members believed that wheat to be sown in wet ground should be pickled.

Yallunda, December 21.

PRESENT.—Messrs. S. C. Fairbrother (chair), F. Olsten, F. Forrest, J. S. Perry, G. Gill, G. A. Teakle, W. Bryant, J. Wood, A. Price (Hon. Sec.).

BEE CULTURE.—Mr. G. A. Teakle, in a paper on this subject, stated that the districts heavily timbered with sugar gum, water gum, and peppermint could be more profitably occupied by bee-keeping than by clearing and wheat-growing. Bee-farming and the

keeping of sheep would work well together, but where a large number of bees were kept and wheat was also grown, too much heavy work fell on the landholder at the one time. A swarm of bees consisted of a queen, drones, and workers. The queen bee was hatched from an ordinary egg and lived three or four years. It was supplied with a food known as royal jelly, which had the effect of producing the difference in her physical structure. As a general rule she laid from 150 to 200 eggs per day during the spring and summer. The male bees, or drones, took 24 days to hatch, and these were killed off by the workers after the breeding season. The workers were hatched in 21 days. Diseases which were disastrous in the apiaries were foul brood, dysentery, and paralysis. Ants, mice, and bee-moths were frequently troublesome. In the discussion which followed, members generally agreed with the paper, but thought that although bee-keeping appeared to be a good paying industry, it was not advisable to go in for it too extensively on the farm.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Berri, January 18.

(Average annual rainfall, 10in.)

PRESENT.—Messrs. S. Phillips (chair), A. P. Wishart, J. McGilton, W. Fielder, R. Koska, A. R. Hahling, W. H. Wade, W. Manyfold, H. R. Antuar (Hon. Sec.), and nine visitors.

Pigs.—Mr. A. R. Hahling read a paper on this subject. He spoke of the value of the pig industry to Australia, and stated that there was considerable scope for the breeding of pigs in this State, and that it was a profitable business. He recommended a sty 15ft. by 8ft. with floors and walls of concrete. In the front there should be a door, and at the back an opening to an enclosed yard. The floor should slope forwards with a drop of about 4in., into a gutter. The walls should be 4ft. high and about 6in. thick, and the roof 8ft. by 9ft., being 6ft. 6in. from the ground in the front and 7ft. 6in. at the back. The progeny of a Berkshire sow and a Middle Yorkshire boar were the best all-round pigs for bacon. The flesh was well placed and of a fine flavor. To make pig-breeding a successful venture green fodders, such as mangolds, lucerne, amber cane, rape, milk-thistles, and clover grass should be grown. These should be fed with crushed maize, barley, wheat, bran, pollard, peas, beans, &c. Old mortar, charcoal, cooked bones, &c., should also be provided. Mr. W. H. Wade had been very successful with pigs at Renmark, where he was growing fruit. They not only fertilised the orchard, but were profitable in themselves. They could be turned into the orchard immediately after the fruit was harvested. Twenty acres, if properly fenced, would support 50 pigs for at least five months.

Clanfield, November 23.

PRESENT.—Messrs. Richards (chair), W. Paull, A. G. Franklin, R. Correll, W. J. Booth, J. Nelson, A. E. Heaven, H. Pavy, L. Orwell, A. Orwell, Wm. Queale (Hon. Sec.), and three visitors.

FARMING SANDY SOIL.—The following paper was read by the Hon. Secretary:—“The term ‘sand’ is generally understood in the Pinnaroo district to mean the sandy rises or hills which are found throughout the mallee country in this portion of the State. This is somewhat confusing, as a large portion of the district consists of sandy and sandy loam flats, and the balance of flats of clayey and loamy nature, with limestone in a greater or less degree in some cases. These loamy and clayey flats are mostly of good quality, and under favorable conditions produce crops equal to those from some of the best wheat

land in the State, and I do not propose to deal with them in this paper. The sandy soils vary greatly in producing capacity and physical characteristics, but on the whole, in favorable seasons, produce profitable crops. Two points in favor of the sandy flats are the ease with which they may be worked when once cleared of stumps, and further, their power of retaining moisture. We find a heavy clay subsoil varying in depth from 6in. to 36in. below the surface, limestone and limestone rubble being present in many instances in this subsoil. The question of drift has not yet become a problem, nor is it likely to do so, owing to the presence of a large percentage of loam in the soil. The color of these sandy soils varies from dark-red to almost white, and much of it is of dark-yellow and brown color. Color is not always a true indication of the quality of the soil, as results obtained show that frequently crops on the lighter colored soil equal and even excel those on the darker colored richer looking land. These soils are practically useless for cereal growing in their virgin state, and grain sown without artificial manures would in all probability not return seed to the farmer. The application of as little as 30lbs. of super. has been found to give a profitable return, while I may safely say that the average amount of super. applied in our district does not exceed 56lbs. to the acre. An expert authority once stated that the great success achieved by small applications of superphosphate in South Australia might be attributed to the excellent start which it gave the young plant. However, the excellent work being done at Roseworthy College and the Government Experimental Farms proves conclusively that the farmer is not doing justice to himself by using such small quantities of super., and heavier applications are becoming usual amongst many of our farmers. In many instances throughout Australia where artificial manures containing nitrogen and potash have been used, the application of these costly plant foods has not justified itself by results. However, it would be well worth our while to experiment in this connection, especially when we remember that in sandy soils the root development is much greater and plant foods are rendered more easily available to the plant than in a soil of richer analysis but heavier character. We should not be content with superphosphate as the alpha and omega of artificial manuring. It may be worth while recalling that Mr. F. Coleman, of Saddleworth, who is a keen experimenter, found after seven years' careful tests that bone super. applied at the rate of 1cwt. to the acre was more profitable than a similar application of superphosphate, the difference in profit averaging 5s. 1d. per annum. Similarly experience may prove that we can increase the production of our farms by the use of manures other than superphosphate. The question of applying slow-acting manures, such as guano and preparations of bone and blood in conjunction with superphosphate, is well worthy of consideration, especially as they would be likely to leave a lasting impression on the soil. Moreover, they would come into action later in the season and would prove of use to the plant, especially as crops on sandy land make most growth during the latter end of spring. Results achieved at Hawkesbury College in New South Wales on sandy soils prove that combinations of bone and blood with superphosphate are highly profitable there. Green manuring would no doubt be of considerable benefit, but this method of improving soil is somewhat costly, and a better method might be the growing of fodder crops, such as rye, oats, or mustard, and feeding down with sheep, thus returning a large percentage of manure to the soil in a form readily available to plant life. Lupins are credited with being of great use as a green manure on sand, and might be well worth a trial. On soils lacking lime, basic slag or Thomas phosphate is stated to be more profitable than super. It may be that an application of lime would pay, and as lime is not only of the greatest importance in unlocking reserves of plant food in the soil, but considerably improves the physical condition of light soil by binding and firming it, experiments would be well worth the making, although, perhaps, the effect of an application of lime might not show up greatly the first year. Burnt lime or oxide of lime ground into powder is the cheapest and most economical form to use, and should be obtained as fresh as possible. It should be possible to obtain this commodity at a cost not exceeding 25s. a ton, the farmer providing bags. To ensure success a fairly heavy application, say half a ton to the acre, is necessary, but this could be split into five separate applications at the rate of 2cwt. to the acre in successive years. Lime should merely be drilled on the surface and harrowed in. The effect of a good scrub burn is always noticeable and is, perhaps, due in a measure to the high lime content of mallee ash and also to the effect of fire in sweetening sour soil. Coming to the question of tillage, it has been found by experience that excessive working on light soils does not pay. Furthermore, when fallowed, worked, and seeded in a dry state the dreaded takeall is almost sure to make an appearance. This shows that some judgment is necessary in handling this soil. Professor Lowrie has urged upon us the necessity of fallowing our land as early as possible in the winter, and if we follow this advice we cannot go far wrong, as the land is then in proper condition. Whether we shall plough shallow

or deeply is a matter which requires thorough testing. Certainly it has been proved that new land cultivated shallow will yield far better results than that ploughed deeply, but the results in this case may be attributed to the good effects of a scrub fire, which only benefits a couple of inches of the surface at the most. We know that where we have the subsoil 3in. below the surface it will not pay to plough 5in. deep, but that is no proof that it will not pay to go deeper in a soil 2ft. or more in depth. If the farmer is able to afford it, I think it will certainly pay in the long run to plough new land. The extra cost of ploughing over cultivating may not be realised in increased crop the first season, but the fact of the stumps receiving a check should weigh heavily. This especially applies to the sandy soil which seems to have myriads of roots crossing and recrossing each other within a few inches of the surface. Most of these roots are of the nature of sponges and must deplete the soil of enormous quantities of moisture and plant food. Hence, the sooner the task of removing these is entered upon the better. Once these roots are removed systematic methods of farming and manuring may be begun. For fallowing sandy land we have a serviceable implement in the skim plough. This plough effectively turns the soil and a large area can be got over in a short time. If, as has been the case for several seasons, we are compelled to seed some of our sandy soil in a dry state we can very well devote a fair area to oats, as this cereal does well on light soil and will yield a payable crop in the most adverse season. We might adopt a rotation, such as fallow, wheat, oats, pasture, then fallow again. The land would then come under fallow every four years, and the risk of takeall would be reduced to a minimum. I believe that heavy seeding is not likely to be a success on light soil, as the plants need room to develop. With light seeding every care must be used to ensure even germination, and to this end we must have our seed cleaned and graded to run as evenly as possible. The quantity of seed is, of course, influenced by the variety of wheat and the time it is sown. It is also necessary to have super. ground as fine as possible and the drill in good order to ensure even running of the manure, as even if sowing 2cwts. to the acre (this represents only about two-thirds of an ounce to the square yard), and great accuracy is required to ensure an even spread, otherwise the crop is likely to be patchy and uneven." In discussing the subject, Mr. Booth said that with Thomas phosphate there would be a difficulty in sowing a small quantity, as the specific gravity was much greater than that of superphosphate. Mr. Paull stated that as a general rule he found the darker colored sandy soil yielded the best results. Members favored heavier manuring and early fallowing, as recommended by Professor Lowrie.

SOUTH AND HILLS DISTRICT.

Blackwood, January 13.

(Average annual rainfall, 27·6lin.)

PRESENT.—Messrs. W. L. Summers (chair), R. Eglinton, P. H. and D. Williams, A. W. Carlos, W. Gamble, J. Nicolle, A. W. and A. A. Magarey, H. E. Sibley, R. J. Wilson, C. Scherer, T. Hunter, C. G. Savage (Hon. Sec.), Veterinary Surgeon Place, and six visitors.

THE FEEDING OF HORSES.—The Government Veterinary Lecturer, Mr. F. E. Place, M.R.C.V.S., B.V.Sc., gave a lecture on this subject. In explaining the digestive system of the horse the lecturer stated that the stomach held about 3galls., and that digestion took place under the best conditions when this organ held half that quantity. The inlet and outlet pipes of the stomach were situated close together, and a distention of the stomach closed both these pipes and caused trouble. Therefore it was advisable to give small feeds at a time, and feed often. When the animal was drinking, the water passed straight through the stomach, then through the small intestine to the cæcum, or water gut, bringing with it the food that was in the stomach; hence, it was necessary to water the horse before and not after meals. No harm resulted from a horse drinking when hot under general circumstances, but horses not accustomed to this practice should be gradually trained to it. A horse might be kept in good condition in slow work by feeding with chaff only, but better results would be secured by reducing the quantity of chaff and substituting

grain, preferably oats. The grain should be merely crushed and not ground. A good average diet for an average working horse per day was 20lbs. chaff, 4lbs. to 5lbs. of long hay, and 6lbs. to 7lbs. crushed grain. The hay should be fed last thing at night. For heavy work more grain should be added. On Saturday nights a bran mash, made by pouring boiling water on 2lbs. or 3lbs. of bran to which was added a handful of salt, then covered with a bag until cool enough to give to the animal, should be administered. The horse should receive less food on Sunday when not working. Salt should be given, preferably by means of a piece of rock salt placed in the manger for the horse to lick. Half the quantity of crushed wheat was better than pollard. There was no danger of founder when wheat was given in moderation. New wheat was worse than old in causing this trouble. In reply to a question as to the feeding value of molasses the lecturer said 5 per cent. of molasses assisted the digestibility, over that amount retarded it. A horse that became excited and scoured when set to work should be kept without a drink during the twelve hours preceding work. The animal should be allowed to drink as much as he liked while at work, but with the bit in the mouth. The bulk of feed should be reduced and more concentrated food given.

Cherry Gardens, December 19.

(Average annual rainfall, 35.3in.)

PRESENT.—Messrs. Chapman (chair), C. Ricks, T. Jacobs, H. Jacobs, T. Jacobs, jun., J. Lewis, C. Lewis, H. Lewis, J. Tozer, A. Broadbent, and S. H. Curnow (Hon. Sec.).

ANNUAL MEETING.—The Hon. Secretary read the following report of the operations of the Branch during the year:—"In presenting to you the twentieth annual report of the Cherry Gardens Branch, I desire to congratulate you on bringing to a close another year of successful work. The membership of the Branch is 17. Thirteen meetings have been held, with an average attendance of about 14 per meeting. The system of half-yearly programmes has continued to give excellent results. During the year eight papers have been read, and four discussions initiated. The subjects that have been dealt with include the following:—"Constructing Wire Netting Fences," "Utilisation of Waste Products," "Ornithology," "Lime-burning," "Care of Harness," "Cultivation and Working of Soil," "Bush Fires Act," "Root Crops," "Irrigation in the Hills," "Does Hay-growing Pay?" and "First Aid to Injured Farmyard Stock." These subjects have been well discussed, and valuable information has been gleaned. During the winter 200 pines were planted at the cemetery. The usual social was held on December 5th last, and the kindly feelings engendered on that occasion have continued throughout the year. We are only a small community, but by adopting each others' better modes of husbandry and discarding our own inferior ones, we must increase the productivity of the district. Our gatherings have been the embodiment of kindly feelings, and although we have differed seriously at times on points under discussion, we have not allowed anything to intervene between us as friends and neighbors." At the close of the business an adjournment was made to the local hall, where the usual annual social was held. Representatives from the Advisory Board and Clarendon and Blackwood Branches were present.

Forest Range, January 25.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. J. Green (chair), O. Pollard, J. Vickers, F. Green, R. Collins, H. H. Schultz, W. McLaren, E. J. Green (Hon. Sec.), and four visitors.

NURSERY STOCKS.—In a paper on this subject, Mr. H. H. Schultz emphasized the necessity for using only the best nursery stocks when planting fruit trees or bushes. When this was done there was more likelihood of the trees making regular and uniform growth. Then the fruit came into bearing earlier. The first essential was to see that the trees were true to name. Trees of the same variety should be planted near each other so that unnecessary travelling when spraying and picking would be avoided. Evenness of growth also should be looked for, and where, say, 100 trees were to be put in, they could well be divided into two grades, those similar in size and shape being kept together. A good young tree should possess a medium-sized trunk between 15in. and 20in. long from the top root to the lowest branch. It should have a single layer of roots not covering

more than about 3in. of the trunk, and three branches covering 3in. or 4in. at the top. The best stocks for apples were T-layered, which could be planted out in the nursery the first year, and top-grafted when a year old. The benefit from this overbudding was that they had a straight stem, and the blight-proof extended up to the forks of the tree. The branches also generally made a more uniform start. In addition, there was little danger of covering the blight-proof when ploughing. Pears should be root-grafted, the roots being taken from trees that did not throw up suckers. This fruit was frequently worked on seedlings, but they were not always to be depended upon. American cuttings were the best for plum stocks, and they could be either budded or top-grafted. Cherries were best when worked on seedling stocks, the Black Mazard seedling, as a rule, being the best, as it grew a stout trunk capable of carrying a large top. Some stocks, however, were better when grown on sorts that grew less vigorously. These should be worked on seedling suckers, but not those known as the Kentish cherries, for they threw too many suckers. Apricots and peaches should be budded on their own seedlings. They should be worked in the nursery to make a trunk about 12in. or 15in. high when planted out. Selected cuttings, straight, and of a medium size were best for gooseberries. All the lower buds should be rubbed off leaving only three on the top. The terminal bud of a shoot should not be left, as it tended to grow straight up. The cuttings should be planted about 4in. or 5in. in the ground; when planted deeper there was a chance of their making two layers of roots. Currants should be grown from cuttings, but there was no necessity to disbud them, because suckers helped to keep the bush renewed. Raspberries were grown from suckers thrown up by old bushes; four or five should be put together to make a bush; the roots should be carefully trimmed so that the canes would be level; the tops might be cut back to three or four buds to stimulate the growth of young canes and establish the bush. Strawberries made young bushes from year to year, but care should be exercised to plant only well-rooted plants. In discussing the subject, Mr. Vickers said it was a mistake to plant inferior trees. Mr. McLaren advised intending planters to place their orders with the nurseryman 12 months ahead of planting time, describing the shape of tree they required. More than four buds should be left on gooseberry cuttings. Mr. F. Green said uniformity in size of trees did not ensure uniformity of growth. Raspberry canes should be cut very short when being planted, as a better growth was secured in the succeeding year. Mr. J. Green preferred the young tree with a stem of about 15in. in length. Care should be taken when budding or grafting that the trees were not worked too low, as when cultivation was being done the soil might accumulate around the stock and blighty roots grow from a scion which was not blight proof. Mr. Pollard favored planting at least six or seven raspberry canes to a stool or bunch and thought they should be pruned very hard the first year. Mr. E. Green said young pear trees should be worked on stocks raised from the pips of the fruit. Trees so obtained never produced suckers. The pips of the Swan Egg pear were said to be the best for raising seedlings.

Hartley, January 22.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), W. Brook, D. Clark, G. Lehmann, W. Birmingham, W. Cross, G. Phillips, T. Phillips, J. M. Hudd, and J. Stanton (Hon. Sec.).

DESTRUCTION OF WEEDS ON FALLOW.—The advantages attending the use of the skim plough, the disc cultivator, and the spring tooth cultivator for the purpose of destroying weeds on fallow preparatory to seeding were discussed. The skim plough turned over and buried the weeds, but it had the disadvantage of leaving the land too open. After being worked with the disc cultivator the ground set together nicely. Whilst it might be urged that this implement left a large number of weeds on the surface, these would not shoot again. The spring tooth cultivator was light in draught, worked the land well, and killed the weeds, unless they were too large. On a vote being taken the following preference was shown:—Skim plough, 4; disc cultivator, 3; spring tooth cultivator, 2.

HARVEST RESULTS.—Members tabled samples of grain crops. Best returns had been secured from the lighter soils and the later sown crops. The dry spring had been too severe for crops on the heavier soils. Crops on fallow land had failed. Yields of wheat ranged between 5bush. and 24bush. per acre, and of oats from 4bush. to 20bush. Golden Drop wheat returned the highest average. Budds, Federation, and Marshall's No. 3 also did well.

INSPECTION OF CROPS IN DISTRICT.—On the 6th November members drove around the district on a visit of inspection of crops, &c. The farms of Messrs. Pratt, Helford, A. Wundersitz, H. Cross, W. and C. Brooks, D. Clark, T. Phillips, G. Phillips, G. Hill, and Hudd were visited. Messrs. Hudd and Wundersitz provided refreshments, and at the latter gentleman's place the evening was spent in social intercourse. This annual visit of inspection is regarded as one of the most interesting and valuable meetings of the year.

Kanmantoo, October 26.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. A. W. Hay (chair), W. Downing, J. Downing, W. G. Mills, W. Shepherd, R. Critchley, R. Talbot, E. Shepherd, G. Downing, R. Downing, H. Pym, T. Critchley, W. C. Mills (Hon. Sec.), and two visitors.

CUTTING AND CURING HAY.—Mr. T. Critchley read a paper on this subject. He advised growing hay crops on well-worked fallow land, and where this was not available, the next best was land that had been grazed with sheep for two or three years. After the grass and weeds had made a good start the land should be well ploughed and harrowed before the seed was drilled in. The Purple Straw, Dart's Imperial, Marshall's No. 3, and Red and White Gamma were the varieties of wheat best suited for this district, and in addition to cutting a good hay crop would be found to yield well if left for grain. Where the objective was hay, about $\frac{1}{2}$ bush. of seed more per acre should be sown than for a grain crop, as the thicker sowing produced a finer straw. Heavy applications of manure were advisable, all loose stones should be cleared off the land, and any rough clods should be crushed. The crop should be cut soon after the grain had formed, when it would be of a nice green color and sweet, without containing much grain. When it was left later the sample contained more grain, but the straw was hard and contained little sap; consequently it was not fit for feeding as long hay. The sheaves should be stooked two or three days after cutting. Small stooks were best. Green hay must not go into the stack. A layer of logs should be used as a foundation, and thatching should be carried out immediately the stack was completed. If the top were not too steep a good covering of loose straw would keep out the rain. Straw for this purpose should be gathered immediately after the stripper had passed over it, and before stock had been allowed to run on the stubble.

Kanmantoo, November 20.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. A. W. Hay (chair), W. Downing, W. G. Johncock, R. Talbot, R. Critchley, H. Shepherd, W. Mills (Hon. Sec.), and one visitor.

FENCING.—In a paper on this subject, Mr. H. Shepherd emphasized the necessity for erecting substantial boundary fences, which should be from 3ft. 8in. to 4ft. in height. Where practicable good gum posts about 6ft. in length should be used. They should be placed not more than 14ft. or 15ft. apart, where netting was run between them, but if no netting were used they should be placed somewhat closer. With a 4ft. fence it was advisable to run a plain wire between the netting and the barbed wire on top, otherwise the space left would be too large. The netting should be buried to a depth of from 4in. to 6in., according to the nature of the soil. Care should be taken to prevent it buckling, and in all cases when erecting fences good strainers should be used, and these should be well strutted. For division fences four or five plain wires would be found sufficient, according to the stock kept, and for sheep five plain wires close together would be found most serviceable. Wherever large stock were kept a barbed wire should be on all fences. Galvanized wire was very serviceable, but great care should be taken not to overstrain it, or it might snap under the influence of frost. In discussing the subject, Mr. Downing expressed the view that a 4ft. fence was somewhat high, generally 3ft. 6in. to 3ft. 8in. would be found sufficient. Mr. Hay thought that in timbered country it would pay to rake the leaves away from the netting fence as a protection against fire. Where stones were plentiful, it would be better to place these on the bottom of the netting instead of burying it in the ground.

Longwood, January 18.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. W. H. Hughes, H. Winter, E. A. Glyde, J. C. Blakley, A. F. Furniss, W. Nicholls, J. Brown, J. R. Coles (Hon. Sec.), and one visitor.

PLUMS.—The meeting was held at the homestead of Mr. H. Winter, and considerable attention was given to the four-year-old Burbank and Wickson plums in the orchard. Trees of the former variety fruited last year and were this year carrying a nice crop. The fruit clustered right on the body of the tree, and was of good flavor, but the taste of the skin was very noticeable. The Wickson was a large handsome plum, but not so prolific as the Burbank, and the tree was considered somewhat delicate. It was necessary to spray it with a weak solution of Bordeaux for a fungus which affected the setting of the fruit. Members generally preferred the Burbank variety, and also recommended Kirk, Skipper, Climax, Angeline, and Burdett.

MacGillivray, November 26.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, A. J. Nicholls, H. E. Petras, H. J. Wiadrowski, H. C. Williams (Hon. Sec.), and several visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. R. Wheaton. A crop of peas of 20 acres, which he planted on August 10th, and which were now fully podded and looking well, was first inspected. Alongside of the peas 20 acres of maize (Hickory King) was just showing above ground. In an adjoining paddock of 27 acres Mr. Wheaton had planted Cape barley for early food. It came in just when most grasses were dead, and he had kept all his horses on it through the winter. Along the banks of the lagoon a crop of 44 acres of Algerian oats on land that last year grew a crop of wheat, which was badly affected by takeall, was seen. This year Mr. Wheaton expected to cut from $1\frac{1}{2}$ to 2 tons of oaten hay off the same land. Adjoining this were 15 acres of the same oats on land that was fallowed, but they showed little improvement over the 44 acres. Twenty-five acres of Combination wheat on fallowed land was well headed and of good growth, and promised a return of 20bush. to the acre. Twenty acres of Cape barley on good strong land was estimated to produce at least 20bush. to the acre. On a limestone rise 50 acres of wheat, Federation and Walker's Early, was estimated to average 15bush., and 12 acres of oats promised a yield of 20bush. From there Mr. Wheaton drove the party to some low, swampy ground where he had 30 acres of malting barley exceptionally well headed. Forty acres of Walker's Early, 35 acres of Federation wheat, and 20 acres of Calcutta Cape oats all looked well and showed the work of a practical and energetic farmer. The property also carried 600 sheep and a number of horses and cattle.

MacGillivray, January 21.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, A. Stirling, jun., H. J. Wiadrowski, H. C. Williams (Hon. Sec.), and one visitor.

KANGAROO ISLAND SOILS.—Mr. H. J. Wiadrowski contributed a paper dealing with what were commonly known as poor soils on Kangaroo Island. These, he said, varied very considerably in their content of plant food. There were some soils which for several seasons would return remunerative crops. These usually consisted of 3in. or 4in. of sand over a subsoil of very retentive clay. In wet seasons this clay, during portion of the time when the plant was growing, presented the appearance of thin mortar. The roots, not having penetrated into the clay, were practically suspended in this, and the subsequent recovery of a crop under these conditions was frequently surprising. However, unless the subsoil in this class of land was broken up, without being brought to the surface, it would not yield payable crops, except in abnormal seasons. In many cases, however, there was from 18in. to 3ft. of soil, and this had in a few instances yielded payable returns. It responded considerably to good cultivation. When dressed with stable manure and used for intense culture, the results were equal to those from the best land in the State. From 12bush. to 16bush. per acre could be expected even in poor seasons. These soils required a good deal of working. The tendency of the majority of farmers on the island

was to work them lightly, which was perhaps due to their being able to secure a good seed bed simply by ploughing. Extra cultivation was required, however, to admit the air and sun into the soil. This was rendered more necessary in view of the cool climate, damp atmosphere, and thick undergrowth on the land. The acidity of the soil could be amended by cultivation, but only after four or five years' work. The best treatment for land which had been cropped the previous year was to plough it in February not more than 3in. deep. It should be cultivated in April, again in May, and then drilled with wheat or oats not later than the end of May. An extra working before was better than harrowing after drilling. The harrows were soon choked with rubbish, and then only smoothed the surface, with the result that rain would cause the ground to cake. Where the soil was free from rubbish harrowing after the crop was up would be beneficial. Land that had not been cropped for a year should be ploughed in late October or early November, and left in a rough state until the end of January. It should then be either cross ploughed or cultivated, but not worked too fine. The acidity of the soil might be rectified by breaking up the subsoil with a plough or by blasting. This would be expensive, but it would provide a means of escape for surplus moisture and admit air. Wheat and oats should be sown before the end of May, until the land had been under crop three or four times. This would enable the plants to get a good start before the winter rains checked them. After having tried different brands of super, he had come to the conclusion that there was no material difference in their effect. A top dressing of $\frac{1}{2}$ cwt. of nitrate of soda about September, however, was payable. When drilling, 80lbs. to 100lbs. of super. should be applied. After applications of up to 2cwts. of super. per acre he had not noticed any appreciable difference in the following crop or subsequent crops. [It is impossible to state with any degree of accuracy whether heavier dressings of super. pay from the appearance of the crop, as few men will claim that they can see a difference of 1bush. or even 2bush. per acre before the harvest. Two bushels increased yield, however, would more than pay for an extra hundredweight of super., in addition to the land being kept in good heart. The only way to find out the most profitable dressing is to weigh the yield from measured areas of crop which have been treated in all respects as nearly as possible alike, with the exception of the quantity of manure applied.—Ed.] Mr. Ayris said it was improbable that a return of 16bush. would be secured under the conditions stated. Mr. Stirling thought the conservation of moisture by fallowing would in many cases benefit crops during a dry spring. Members were divided in opinion as to whether it was advisable to leave fallow in a rough state. It depended very much on the drainage of the soil. One objection to this was the subsequent trouble involved in reducing the ground to a good tilth. The Chairman mentioned that the quality of soil in ironstone country varied greatly. He preferred oats for the first crop for poor soils, and wheat for a good land. He had grown 1 ton of hay per acre on honeysuckle country. A discussion as to the advisableness of cropping new land continuously as against alternate fallowing proved interesting. An instance of five years successive oat crops terminating with a 2-ton yield of hay was reported. Oats were apparently more suitable than either wheat or barley for planting season after season on the same patch. Fallow after the first crop was favored by some. The time for fallowing should be decided by circumstances, but it was best to finish ploughing before October. The Chairman would not sow wheat until June or July.

POTATOES.—Mr. Stirling reported having dug a potato plant bearing 30 tubers.

Meadows, January 27.

(Average annual rainfall, 34 $\frac{1}{2}$ in.)

PRESENT.—Messrs. G. Ellis (chair), G. T. Griggs, W. Nicolle, J. Stone, J. Catt, A. J. Ellis, J. Morris, H. A. Kleemann, and W. H. Bertram (Hon. Sec.).

MANURING FRUIT TREES.—Mr. G. T. Griggs read a paper on this subject. He had tried several different manures, and found the practice of manuring payable. As a general rule it gave the fruit a better color. Land in the district required salt and lime, and this year applications of gypsum had returned results, not only with fruit, but with hay and peas, equal to those received where other manures were used. Mr. W. Nicolle thought it a mistake to put the manure too close to the trees, especially when they were young.

VALUE OF PEAS FOR TOPPING OFF SHEEP FOR MARKET.—In a discussion on this subject Mr. W. Nicolle said that feeding off peas, where the sheep could also get grass and weeds, was a better method than feeding after they were thrashed and bagged. Mr. Jas. Stone

thought the best time to turn in the sheep was just before the crop matured. The sheep seemed to take to the peas more readily than when they had dried off. Mr. Jas. Morris had noticed that the pigs suffered from an ailment somewhat of the nature of indigestion when turned on to an unripe pea crop. Mr. Griggs had seen no ill effect in this regard if the crop had turned yellow. It was better to rake off the pea stubble than to cut it if the paddocks were intended for grazing.

Port Elliot, December 13.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. H. B. Welch (chair), J. F. Vince, J. Brown, H. Welch, J. Chibnall, W. E. Hargreaves (Hon. Sec.), Mr. F. E. Place, B.V.Sc., M.R.C.V.S., and 30 visitors.

CODLIN MOTH.—Mr. W. E. Hargreaves contributed a paper, in which he stated that the chief factors to be regarded in the destruction of the codlin moth were (1) to use the proper spray mixture, (2) to spray at the proper time, and (3) to carry out the operations thoroughly. He preferred arsenate of lead, because it could be used freely without danger of injuring the trees or young fruit. The first spraying should be done as soon as the petals of the flowers fell, as a few days after this occurred the calyx closed, and the object of the spraying was to fill the calyx cup with the poison. A good spraying outfit was necessary, and one in which the agitator was continuously moving should be procured. The whole of the tree should be thoroughly wet with the mixture. He had found that 2½lbs. of arsenate of lead to 100galls. of water was the most profitable solution to use. Careful attention should be given to the weighing of the lead. If the first spraying were thoroughly carried out, there would generally be little need for a second or third operation, as there would be few moths left. Old empty fruit cases should never be introduced to the orchard without first being steeped in boiling water for a few moments. In discussing the subject, members were of the opinion that if fruitgrowers were to thoroughly spray their trees at the correct time little damage would be done by the codlin moth.

SOUTH-EAST DISTRICT.

Mount Gambier, December, 14.

(Average annual rainfall, 31½in.)

PRESENT.—Messrs. A. J. Wedd (chair), G. H. Kilsby, R. Fowler, H. G. Wheeler, J. Keegan, A. A. Sassanowsky, R. P. Pritchard, J. Watson, D. A. Collins (Hon. Sec.).

SEASONABLE SUBJECTS.—Mr. G. H. Kilsby read a paper dealing with several matters of interest as follows :—*Sheep and Wool.*—The class of sheep to keep will greatly depend on the country, but as a general rule in our district the Lincoln crossbred is the most useful for the dual purpose of wool and mutton. Notwithstanding that many other breeds have been tried from time to time, this cross maintains its superiority. It is a good doer, will cut the most valuable fleece of any crossbred, will produce a good export lamb, and should you not get all or any part of them off for this purpose, you still have a good animal on your hands for either keeping or for market. On our richer lands I prefer the second or heavier cross, as they seem to grow to a greater weight. The first or finer crosses are better adapted for all other pastures. I should like to see every young man at all interested in rural pursuits take a course of lessons in wool-classing, for which our School of Mines has made provision. He may also follow these courses of lessons by going on to some of the northern sheds for a year or two, and if apt can win his diploma and become a fully accredited wool classer. I am surprised that so few avail themselves of the advantages that have been provided for them in this direction. In getting a clip ready for market.

care must be taken to first properly skirt the fleece, and in this a great deal of judgment is needed, as some fleeces do not require so much taken off as others, especially in the crossbreds. The fleeces should then be rolled, keeping the side (not back) outwards, and rolling from the breech to the neck. The fleeces need not be tied. In classing care should be taken to put as nearly as possible in small clips and in large clips exactly the same quality or grade of wool in each class. In small clips avoid making too many classes, as this will render the whole of it 'star lots.' Keep all bollies to themselves. Class the pieces into first and second classes. Rough or heavy conditioned fleeces that will not fit in with the other lots, keep by themselves and mark accordingly. Brand the bales as explicitly as possible, so that there will be no confusion when buyers or brokers are treating with it. *Hay*.—A large amount of grass hay is made in this district, and it is a fine standby, especially to dairymen. Care should be taken to cut just when it is ready, and experience is again needed here, as different grasses need to be cut at different times. Frequently a large amount of the nutriment is lost by over drying grass hay. I prefer to have it horse raked as soon as practicable and cocked immediately. About the only other growth cut for hay in this district is Algerian oats, and there is a diversity of opinion as to the stage at which it should be cut. Personally, I prefer cutting when the crop is on the turn for ripening, as the grain will mature in the stooks, and also that bitterness which is characteristic of this oat in the green stage will be avoided. Stook immediately after cutting and avoid making stooks too large, so that you will be able to stack earlier. Stacking should be done early to prevent loss in nutriment and weight. *Oats for Grain*.—This is an important industry in our district. We have two flourishing oatmeal factories doing a very large trade. We produce the finest sample of milling oats in Australia. By change of seed and whatever other means we can employ, we should keep up the high standard, and raise it, if possible. In harvesting the oat for milling or seed purposes it should be allowed to ripen, but should not be over-ripe, as in a few hours of either hot wind or storm there will be much loss. Get it down as soon as it is ready, and stook immediately. If ripe it need not be long in the stook before being stacked. Leaving it in the stack for a while seems to have the effect of mellowing the grain. Avoid getting the oats wet. They are always brighter if kept dry. *Barley*.—The next matter that claims our attention is the barley harvest, and a very remunerative one it is likely to be this year. Generally speaking, the crops are excellent. Of course, this crop is just now in the critical stage, and anxiety is felt on every hand on account of the caterpillars. I have generally used arsenic mixture for poisoning these. Paris green is also good. If possible lay it in the afternoon, and they will go for it at once while it is fresh. Immediately after rain the caterpillars will take the poison ravenously. For harvesting barley my remarks regarding oats are applicable also. As soon as it is ready lose no time in getting it into the stook, for the sooner you get it there the more you will have of it. Get it either threshed or stacked as soon as possible, as rain will discolor it and reduce the selling value. Mr. Kilsby also urged that every lad should have a chance to learn the rudiments of carpentry. This was so useful on the farm, and wet days and slack times could be usefully employed in making gates and doing all manner of needful woodwork. Mr. Wheeler mentioned that grass hay which was cut early, and not raked immediately, went black. Mr. D. A. Collins had found that where a lucerne crop was not raked directly after cutting, the leaves fell. Mr. Sassanowsky believed in cutting oats for hay when the grain was between the milky and doughy stages. If allowed to ripen the crop would be practically grain and straw. Barley would get a better color if allowed to lie, but there was considerable risk. Mr. R. P. Pritchard thought there was a tendency to overclass wool clips. The legs should be taken off, but the necks could well be left on, as they were quite as good as the other parts of the fleece. Dirt should be removed from the wool, but it was a mistake to interfere too much with the fleeces. Too many classes were not desirable.

HORSE DENTISTRY.—Mr. J. Keegan read the following short paper:—"Dentistry is the art of repairing the teeth or improving their utility. It is, however, essentially a mechanical rather than a surgical and a preventive rather than a curative effort. The principal object of dentistry is to promote the general health by improving the mastication and by relieving pain. Human dentistry owes its existence to a single disease carrier, while animal dentistry depends upon a single physical defect—enamel points. Most owners have had trouble with horses in this way, and my experience is that the horse is a great sufferer, the most common ailment being enamel point, foreign bodies jamming between the teeth, and imperfect or non-shedding of the pre-incisors and molars." Mr. D. A. Collins considered that the teeth of all animals should be inspected annually. Mr. A. A. Sassanowsky agreed; a faulty tooth frequently lacerated the mouth of an animal, and under those conditions it could not possibly do well.

Penola, December 7.

(Average annual rainfall, 26½ in.)

PRESENT.—Messrs. H. Richardson (chair), D. Fullerton, L. W. Peake, A. H. Strong, D. Adamson, W. Miller, A. E. Lampe, F. R. Field, S. Ockley, and one visitor.

VISIT TO NANGWARRY FOREST.—Several members made a trip to Nangwarry Forest Reserve on November 18th. Five years ago a small area was planted with *Pinus insignis* as a trial plot. The resultant growth was so satisfactory that the Government resolved to continue the planting. Five hundred acres had since been cleared in that part of the forest where the natural timber was least valuable, and the pines had been planted. The transformation was a considerable surprise to the visitors. The ground seemed eminently suited for the trees. Four and five-year-old trees were over 20ft. in height, and in the whole plantation there did not appear to be any failure of the young trees to “strike.” There were between 500 and 600 trees per acre. These, of course, would be thinned out as they increased in height. The seeds were planted in the nursery in September, and transplanted during the following winter. The plantation impressed members strongly as an important development for the district, and a sound and remunerative operation on the part of the Government.

VISIT TO KYBYBOLITE EXPERIMENT FARM.—Mr. Adamson reported having attended “visiting day” at Kybybolite Farm on November 28th. Considerable improvement was noticed in the condition of crops compared with former years. A noticeable feature was that, whereas several varieties of wheat had been tried, the different varieties of oats had not received the attention one would expect in regard to finding the sort most suitable for the locality. Maize was showing nicely, and there was splendid feed in the paddocks laid down with rye grass. Heavy dressings of fertiliser apparently had not caused appreciably higher yields.

AMERICAN PLUMS.—Mr. Peake tabled a branch heavily laden with American plums for preserving, of which he spoke highly. He expected 20 cases from one tree. The fruit was brownish in color, which characteristic it retained right from its formation on the branch. The Secretary tabled some Red Skin potatoes grown from seed planted in August.



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All communications to be addressed:

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Farmers' Conferences.

The Annual Conference of the South-Eastern Branches of the Agricultural Bureau will be held at Penola on Wednesday, March 19th. The arrangements are in the hands of the local Branch, and an interesting and instructive agenda is now being prepared. Among those who will probably attend are the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), the Director of Agriculture (Mr. Wm. Lowrie, M.A., B.Sc.), the Superintendent of Agriculture in the South-East (Mr. W. J. Colebatch, B.Sc.), and the Wool Instructor (Mr. H. Jackson). Saddleworth will be the meeting-place of the Annual Conference of the Northern District, to be held on Thursday, March 27th. The Conference will be opened by the Minister of Agriculture, and among the speakers will be the Director of Agriculture, who will deal with the question of "Sheep and Fat Lambs," the Veterinary Lecturer (Mr. F. E. Place, B.V.Sc.), whose subject will be "The Foot of the Horse," and the Horticultural Instructor (Mr. Geo. Quinn). The Annual Conference of the Northern Yorke's Peninsula Branches will be held at Kadina, probably on April 17th.

1913-14 Egg-laying Competition to be held at Parafield Poultry Station.

The Poultry Expert advises that the entries in the three sections of the laying competition to begin at the new station at Parafield on April 1st are now completed. Victoria and New South Wales are well represented and, in addition, there is one pen from Scotland, with the possibility of a late entry from England in addition. Inquiries from America were too late to allow arrangements to be made. The total number received establishes a record for any one competition. Last year 134 pens competed at Roseworthy; but this year the new poultry station will start with the fine total of 155 pens actually entered. The entries in the various sections are—Section 1: light breeds.—White Leghorns, 100 pens; Brown Leghorns, 1 pen; Minorcas, 1 pen; total, 102 pens. Section 2: heavy breeds.—Black Orpingtons, 13 pens; Buff Orpingtons, 1 pen; Silver Wyandottes, 4 pens; White Wyandottes, 1 pen; Langshans, 2 pens; Faverolles, 1 pen; Plymouth Rocks, 1 pen; Dorkings, 1 pen; total, 24. Section 3: competition limited to farmers, fruit and vegetable growers, pastoralists.—White Leghorns, 27 pens; Black Orpingtons, 1 pen; Langshans, 1 pen; total, 29. Grand total, 155 pens = 930 birds. New South Wales sends 7 pens, Victoria sends 21 pens, Broken Hill 1 pen, Scotland 1 pen. A glance at Section 2, heavy breeds, shows the

trend of the times ; but there is ample room and warrant for better entries from the breeders of the all-round breeds. Section 3—This class is an experiment designed to attract farmers and other producers, with the hope of promoting the breeding of high class utility poultry on the land. The entry of 29 pens is very satisfactory. The fact that Leghorns again predominate shows that the farmer is of opinion that eggs pay better than table poultry. The summary of the birds is as follows :—White Leghorns, 762 ; Brown Leghorns, 6 ; Minorcas, 6 ; Black Orpingtons, 84[†] ; Buff Orpingtons, 6 ; Silver Wyandottes, 24 ; White Wyandottes, 6 ; Langshans, 18 ; Faverolles, 6 ; Dorkings, 6 ; total, 930 birds. Many other breeders stated they would have entered, but for various reasons were unable to do so. The value of these competitions in promoting good breeding and in advertising the industry and the State is very evident. Some highly interesting results are confidently expected, and will be exceptionally valuable when obtained from such a large number of hens. The legbands and full directions for dispatching the birds are being sent to the various competitors. All communications in reference to the poultry station and competition must be addressed, “ The Poultry Expert, Department of Agriculture, Adelaide.”

Imports and Exports of Fruits and Plants.

During the month of February, 1913, 2,142bush. of fresh fruits, 2,408 bags of potatoes, 3,840bush. of bananas, and 6pkgs. of bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885 ; 326bush. of bananas were destroyed (over-ripe). Under the Federal Commerce Act, 2,108 cases of fresh fruits, 100pkgs. of honey, 35pkgs. of peas, 6pkgs. of preserved fruit, 28pkgs. of currants, and 40pkgs. of raisins were exported to oversea markets during the same period. These were distributed as follows :—For London, 35pkgs. of peas, 100pkgs. honey, and 28pkgs. of currants ; for Germany, 931 cases of apples and 403 cases of pears ; for India, 716 cases of apples and 6pkgs. of preserved fruit ; for Batavia, 58 cases of apples ; for New Zealand, 40 packages of raisins. Under the Federal Quarantine Act, 2,124pkgs. of plants, bulbs, seeds, nuts, &c., were examined and introduced from oversea markets.

Berseem, or Egyptian Clover.

In the January number of the *Journal* were published some reports concerning the results obtained in different parts of the State from the Berseem seed (*Trifolium Alexandrinum*) imported and distributed by the Department of Agriculture. Since then further reports have been received, including a striking confirmation as to its value as a fodder from Mr. A. J. Potter, of Port Lincoln. Mr. Potter writes—“ I grew a small plot of Egyptian clover

last year without irrigation. It was planted in July and kept green until December. We cut it nine times, the yield being at the rate of 23 tons to the acre. Afterwards we turned the stock on the plot, the height of the clover then being from 20in. to 3ft. It does best on rich, black, moist ground—sowing 25lbs. to the acre. I took first prize with it for green fodder at the local show.”

Synthetic Milk.

In the January number of the *New Zealand Journal of Agriculture* appears the following report on synthetic milk, the new artificial substitute of milk made from vegetable products, the discovery of three German scientists, received from Mr. Walter Wright, the New Zealand Inspector of Dairy Produce in London :—“ Mr. A. J. Faulding, of 265, Strand, produced various edible substances derived from synthetic milk, or from the materials of which synthetic milk is composed, and gave some further information regarding this wonderful product, which it is said is an efficient substitute not only for cow's milk, but for various other nutrients. He produced a certificate from Messrs. Harrison & Self, the well-known analytical chemists, of 55, Chancery Lane. The following is the comparative analysis between standard cow's milk of exceptional rich quality, and it is far better than the milk which comes up to the requirements of the Board of Agriculture :—

<i>Synthetic Milk.</i>		<i>Cow's Milk.</i>	
Proteins	3.70	Proteins	3.30
Fat	3.97	Fat	3.60
Sugar	3.78	Sugar.....	4.80
Mineral matter	0.79	Mineral matter	0.73
Water	87.84	Water	87.60

The composition is thus very closely similar to that of rich cow's milk. The fat is in a very fine state of division, microscopical examination showing that the particles are considerably smaller than the particles of fat in cow's milk ; this will conduce greatly to easy assimilation. The phosphorus exists entirely in the form of organic compounds, and is therefore capable of being utilised to the full when the milk is taken as food. Among the exhibits displayed by Mr. Faulding the following are noteworthy :— Cream for cooking or ice cream in paste form ; a substitute for meat which may be roasted or boiled, and is said to possess more than twice the nourishment of beef, and which can be produced and sold at half the cost of good fresh meat. These products are very palatable. Some samples of a substitute for macaroni were shown, and these are said to be far richer than macaroni, and quite suitable for consumption without any addition of meat or cheese. Mr. Faulding also explained that the arrangements for the first factory are nearly complete, and the premises are about to be taken in London for the first plant suitable for the manufacture of not less than 40,000 quarts of milk per day. These

premises will only supply a one-twenty-fifth part of the requirements in London, and a London company for the laying down of plants in various parts is about to be formed, the parent syndicate being practically completed. Applications for licences to work the process are being received from all parts of the country."

The Manure Heap.

Many farmers would be able to practise greater economy if they were better acquainted with the real value of the oft-neglected manure heap; and yet, if properly handled, it is a source of plant food for which, in other forms, they pay out large sums of money. The preservation of the rich fertilising material in it should be a subject of continual care.

America's Oldest Apple Trees.

An interesting account of the oldest grove of apple trees in America is contained in the annual number of the *Californian Fruit Grower*. These trees, some 60 in number, are located on the eastern slope of the Manzano Mountains, in New Mexico, and are said to have been planted by Franciscan monks in the 17th century. They are watered by a natural spring. The writer proceeds—"The trees are well grown, vigorous, and productive. Not a tree has ever been touched with a pruning hook, for the Manzano people have a deep regard for the grove, which is almost sacred. They will not allow it to be touched. There is little doubt that with a few years of scientific care the fruit of these trees could be restored to something of its original quality. The variety is not known. A number of apple experts who have examined the trees have been unable to place them. When we visited the trees in August, every one was laden with fruit. The mature apple is of medium size, a light yellow, and of delightful flavor. The apples are knotty and imperfectly formed, but are entirely free from worms. With care there is no question but that the trees would continue to bear for another century. Manzano is the Spanish word for apple, and it is from this remarkable grove that the great mountain range takes its name."

Drying Fruit by Dehydration.

A new process for drying fruit which has come into favor in some quarters in California is that of dehydration. As against evaporation it is claimed for the new process (1) that it costs less, (2) is much quicker in operation (apples, it is stated, are treated in 55 minutes to one hour), (3) all fruit and vegetable products analyse the same as they do before dehydration (for the system eliminates nothing but the water), (4) uniformity of all products dried, regardless of weather conditions, and (5) that fruit and vegetables

dehydrated by the system advocated keep indefinitely. One hydrator company advertise that their plant consists of four compartments, viz. :—(1) For cooling water to be used to cool air; (2) for cooling air which is to be used for drying the fruit, the object being to free this air of its moisture by cooling to a temperature of 50° Fahrenheit; (3) for heating the moisture-freed air to 130° Fahrenheit to increase its capacity for holding moisture; (4) the drier, in which the warmed, expanded, dried air is passed over the fruit and becomes charged with moisture and is then passed out of doors.

Value of Cow Testing.

A cow that does not produce at least 150lbs. of fat in a year (says John F. Sinclair, in *Agricultural Co-operation*) will not pay for the feed she consumes. It costs but little more to keep an animal that will produce 300lbs. of fat than one that produces 150lbs. There is a profit from the one, but none from the other. It is, too, a well-known fact that animals capable of producing only 150lbs. of fat in a year tend to produce animals of the same capacity. In order to improve the dairy herd it becomes necessary to know the animals that are profitable and those that are unprofitable. Yearly records are the best guides. With these and a knowledge of the animals' breeding powers, conformation, and other characteristics, a dairy farmer is in a position to build up a herd of good dairy cows. When we take into consideration the present prices of land, the cost of hired help, the demands of our civilization, we find no place on the farm for an unprofitable animal. The cow-testing association helps the farmer in securing a profitable herd of cows. It also helps him to see the importance of preparing the right kind of ration for his herd and giving them daily care.

Crossbreeding.

If breeders know no more than to mix up different breeds of horses (says a writer in *The Breeders' Gazette*) that it has taken centuries to separate, then the new stallion law that makes it necessary for some to advertise their stallion as "A grade" is no good. If mixing up breeds is the right theory, then let us quit importing, and use our own mongrel scrubs. Both ways cannot be right. Mongrel and cross breeding have lost the farmers and breeders more money than anything else on earth. I raise pure-bred hogs, but did not have enough to eat up my corn, and bought a few good cross-bred hogs to fatten. Both lots were fed and cared for exactly the same, and at six months the crossbreds weighed 150lbs., while the pure-bred ones weighed over 200lbs. One of my friends says he always cross breeds, and certainly he has a poor looking herd of hogs. Some men advocate just one cross. But if one mongrel

cross is good, then it stands to reason that two or three such crosses would be much better. Our cousins across the water laugh at us for this kind of work, and no wonder. We have enough of types and kinds, enough of misfits and mongrels, enough of canners among our cattle, enough of scrubby, spotted hogs. Life is too short and the price of land too high for such foolishness. In the future we should breed more in line. Why should we not breed only to the best and quit wasting our time and feed?

Improving the Dairy Herd.

In Denmark a bull is regarded as useless for breeding purposes if he does not possess a milking pedigree, both on the side of the dam and of the sire, for generations back.

Value of Ripe Apples.

The old idea that apples were the favorite fruit of the gods is a plausible theory. The freshness of youth was ever possessed by those who made apples their principal diet. Certain it is that there is no food so valuable. Apples nourish the brain and spinal cord. They contain phosphorus, albumen, sugar, gum, chlorophyll, malic acid, gallic acid, vegetable fibre, and water. They cure gout and rheumatic disorder, and exercise a beneficent influence on the liver and stomach. Ripe apples and bread as a diet will do more to restore health than drugs.—*Family Doctor*.

Food for Pigs.

No practical or scientific arrangement of foods can beat skim milk and barley meal in the production of quantity and quality in pork, though perhaps a little wheat middlings, seconds, or pollard may make the dietary more perfect, especially for young pigs. Whatever combination of foods is used it should therefore balance closely to a skim milk, barley meal, and pollard standard. All cereals are good for pork production, but the general rise in their price, as compared with that of 20 years ago, puts calculations as to the cost of pork production on another basis. Barley stands first in order of merit, oats a close second, then wheat, and, lastly, maize. Experiments show that 6lbs. of good barley meal will give an increase in live weight of 1lb. where pigs are carefully tended. Meal should be made from sweet, dry grain, and it should not be allowed to ferment. It should be well soaked before being consumed, but a little grain thrown down to young pigs busies them and appears to do them good.—*Agricultural Gazette*.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

STOCK INQUIRIES.

(Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer).

Dizzy Cows.

A member of the Morphett Vale Agricultural Bureau reports having had some cows go dizzy and stiff, and asks for the cause.

Reply—The symptoms are those of the early stage of dry bible, and it will be well to let the cows have a lick of bonemeal and common salt, equal parts, and sulphate of iron, one-twentieth of the mixture, *e.g.*, 10 of each meal and salt and one of sulphate of iron. For those that are ill it would be well to give the following powder twice daily in half a pint of yeast and a quart of beer at first, and beer only afterwards:—Nux vomica 1 dram, gentian 1 dram, sulphur 1oz., salt 1oz. Probably three or four days' treatment will suffice. Treatment of the pasture with bonemeal has also been found very effective.

A Bladder Trouble.

The Meningie Agricultural Bureau asks for a cure for a horse that will not make water while at work, nor during the mid-day stoppage, and when he does there is often a little blood comes after the water.

Reply—Most probably there is a collection of sand or stones in the bladder, and it would be well to let a veterinary surgeon examine that organ. As the passage of water is painful the horse prefers to retain it as long as possible. Encourage the animal to drink as much and as often as possible, and in the night drink, if feasible, put in a couple of quarts of barley water made by scalding pearl barley. Do not allow pea straw. Give the following powder either in the feed or mixed with molasses on the back teeth twice a day:—

One dram each of powdered camphor and bicarbonate of potash, and $\frac{1}{2}$ oz. of linseed meal. Do not give any saltpetre. If much blood passes, five drops of veterinary tincture of cantharides may be mixed with the powder.

Results of Feeding on Yacca.

"J. W. H.," Port Lincoln, has three young cows feeding on scrub and yacca; are blind at night and seem better in the morning; fair condition, but loss of milk. He asks for information.

Reply—The blindness is caused by a poorness of blood, which is brought on to a great degree by the yacca. Treatment—Bleed the cows, $1\frac{1}{2}$ quarts. Change feed off yacca if possible, and give an ounce of the following mixture in a quart of linseed gruel every day for a fortnight:—Epsom salts 1lb., flowers of sulphur 1lb., sulphate of iron 1lb., powdered nux vomica 1lb.

Strangles.

The Coorabie Agricultural Bureau writes that a member has a filly which, when 18 months old, had a bad attack of strangles. The abscess under the jaw discharged so much that food and water leaked through. The edges of the wound seem to have grown to something inside, and the discharge continues at intervals. What is the treatment?

Reply—There is every possibility that, owing to the too active ulceration, a duct which passes through the parts has been injured, and the outer edges, uniting with the skin, have formed a permanent pipe called a fistula—different to the same name on the withers. It will be well to get some corrosive sublimate or perchloride of mercury (both names being used for this substance), and make a solution in water of 1/1000 and syringe this into the wound once a day, about 2ozs. or a wineglassful. After dressing with this put a little chlorinated lime on the opening, and in a week or so it should be closing permanently.

Fistula.

The Glencoe Agricultural Bureau asks for information as to the causes of fistula.

Reply—In the first case an injury to the underlying tissues of the withers, such as a bad-fitting saddle, bruising by rolling on a stone, or hitting a low limb. Secondly, germs already present in the blood find these bruised tissues unable to resist their attack and specially suitable for their growth; hence the burrowing of pus or matter and the eventual breaking out. Treatment—Even in the early stages, and always in the later, the knife should be used, boldly cutting down to the damaged bone or gristle and scraping off the dead black tissue. Clean out the wound with a good antiseptic, and daily afterwards irrigate it for half to one hour with cold water from a hose where possible, or a bucket hung above the animal with a syphon, say of soft cotton cord,

leading the water into the wound. When, after a week or two, no more matter flows from it, treat it as an ordinary wound. If this method is properly carried out most cases can be cured in two or three months.

Flies' Eggs.

Some flies' eggs which were thought to be those of the bot, forwarded by the Morphett Vale Branch, were submitted to the Government Entomologist (Mr. A. M. Lea) who confirmed the opinion previously given by the Veterinary Lecturer that they are not botfly eggs. Mr. Lea writes—"The eggs belong to one of the blowflies; the eggs of the botfly are very different, as they have curious processes at the tail end to enable them to be fastened to the hairs." One of the differences he refers to is the trapdoor at the blunt end. The botfly's eggs are arranged on the hair very like the flowers of the foxglove on its stem.

Cow's Swollen Jaw.

"A. S." writes—"A cow's jaw swells from the throat to the bottom lip, feeling soft and jellylike. After 10 days the swelling gets harder and breaks, appears to heal, but leaves a callus. Would there be any danger in using the milk from a cow affected in this way? Would the beef be fit for human consumption?"

Reply—Unfortunately a satisfactory answer cannot be given without an inspection of the cow, and as there is a possibility that the swelling may be due to contagious disease, it would be well to report it to the Inspector of Stock, who would be in a position to advise. The swelling may arise from actinomycosis or tuberculosis; on the other hand it may be only a simple abscess: but in any case the milk from a cow so affected would not be a desirable food. The question of the fitness of the beef could only be settled by a veterinary inspection of the carcass at the time of slaughter.



ROSEWORTHY AGRICULTURAL COLLEGE HARVEST REPORT, 1912-13.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College.

(Continued from page 760.)

WHEAT CROPS.

We now come to the 1912 wheat crops, which I propose taking field by field.

EBSARY'S A.

The cropping area of this field is 54.206 acres; of this area 35.339 acres were under various varieties of wheat. The past history of the field may be summarised as follows:—1899, purchased and fallowed; 1900, wheat; 1901, bare fallow; 1902, wheat; 1903, bare fallow; 1904, wheat; 1905, pasture; 1906, bare fallow; 1907, barley; 1908, pasture; 1909, pasture; 1910, pasture; 1911, bare fallow; 1912, wheat, barley, and rye.

It will be noted that from 1908 to 1910 inclusively—three consecutive years—this field was allowed to lie out as pasture. This arrangement was not so much intentional on our part as the consequence of rather unusual circumstances. The field lies in a natural depression towards which converge the flood waters of the district; and both in 1909 and 1910 the field happened to be under water at the time of the year when we were prepared to fallow it.

The varieties of wheat sown in Ebsary's A are all pedigree strains of College selected varieties, the importance of each individual pedigree being indicated by the number of the selection to which each variety is referred in the table below. Included among these varieties are two new varieties of our own creating, viz., an early wheat, "Queen Fan" (a cross between Carmichael's Eclipse and Fan); and a rather late midseason wheat, "King Fan" (a cross between King's Early and Fan).

Below in Table XIV. are given full seeding and harvest details concerning the wheats sown in Ebsary's A.

TABLE XIV.—*Showing Seeding and Harvest Results of Wheats Sown in Ebsary's A.*

Variety.	Selection.	Area. Acres.	Date Sown.	Seed	Yield per Acre.		Weight
				Used. lbs.	Bush.	lbs.	of Bushel. lbs.
King's Red	6th	1-719	May 2	90	29	16	63½
Queen Fan	2nd	1-024	May 1	85	28	41	64½
Bearded Gluyas	6th	1-697	May 15	92	27	42	63½
King's White	6th	2-843	May 15-16 ..	92	27	17	63
Viking	3rd	1-008	May 1	85	26	25	62½
Marshall's No. 3s	4th	0-511	April 30	85	25	19	65
Gluyas	4th	17-702	May 16-17 ..	95	25	11	62
Carmichael's Eclipse .	4th	0-898	May 2	85	25	5	65½
Late Gluyas	6th	1-608	May 1	90	23	44	62½
Jonathan	3rd	1-364	May 1	85	23	5	65½
Marshall's No. 3A ...	4th	1-125	April 30	85	22	2	62½
College Eclipse	4th	1-161	May 2:	85	21	57	63
College Comeback ..	4th	0-633	May 2	85	20	32	65½
Federation.....	3rd	0-995	April 30	85	17	36	64½
Wilmington	1st	0-742	April 30	85	14	34	64½
King Fan	2nd	0-309	April 30	85	8	28	61½
Average yield of field	—	35-339		—	24	48	—

It should be noted that King Fan, which yielded so poorly, was blighted off by hot weather in October; and in the majority of cases only portion of the ear carried grain. On the whole, perhaps, this variety is too late for our district.

GRAINGER'S C.

The cropping area of this field is 78-589 acres; of this area 32-992 acres were under wheat. Full details bearing on the past history of this field and its general treatment in 1911 have been given when referring to that portion of it which carried hay. It will suffice, therefore, to state here that the area under wheat was treated as bare fallow in 1911.

Only one variety of wheat was sown in this field, viz., Gluyas of the 4th selection. The seed was drilled in at the rate of 95lbs. to the acre with 2cwts. of superphosphate on May 18-22.

The yield in this field was 20bush. 31lbs. to the acre.

THE ISLAND B.

The cropping area of this field is 147-509 acres; and the original intention was that the great bulk of it should be harvested for grain; and accordingly seeding operations were carried out with this object in view. It has already been stated that after having cut out our legitimate hay crops we found ourselves still somewhat short of our hay requirements, with the result that over 92 acres of the Island B were cut out for hay. This left a balance of 51-254 acres under various varieties of wheat.

The past history of this field may be summarised as follows :—1897, purchased and fallowed ; 1898, wheat ; 1899, pasture ; 1900, bare fallow ; 1901, wheat and oats ; 1902, bare fallow ; 1903, wheat and oats ; 1904, pasture ; 1905, bare fallow ; 1906, wheat, pease, and barley ; 1907, bare fallow ; 1908, wheat and oats ; 1909, bare fallow ; 1910, wheat ; 1911, bare fallow ; 1912, wheat.

It will be noticed that this field has been rather continuously under alternate cropping and bare fallow since it was first acquired for the College in 1897. Thus it has not been left out for pasture since 1904, a period of eight years. The reason of this has hitherto been that the field being distantly situated from the water mains has not yet been provided with a permanent water supply ; and to have left the field out for depasturing livestock would have proved inconvenient. This long period of cropping and bare fallow has brought along in its train a series of evils, of which lack of good agricultural condition and weeds are not among the least ; and in 1912 we were destined to reap the full benefit of this unfortunate state of affairs. In this field, however, we were also beset by misfortunes of another order. There is no field on the College Farm in which germination proved more faulty than was the case in the Island B. Most of the varieties sown in this field were drilled in rather early ; and, unfortunately, the grain malted rather badly under the pernicious influences of light May showers. Hence in the end the crops proved not only thin, but also very dirty, and the yields generally low.

The field was fallowed in 1911 between July 25th and August 26th ; it was rolled in the latter half of October and cultivated early in November. It was cultivated a second time in December and January, and a third time in front of the drill. Later on the growing crop was harrowed between July 17th and 24th.

Full details concerning seeding and harvest operations are shown below in Table XV.

TABLE XV.—*Showing 1912 Returns from Wheats Sown in Island B.*

Variety.	Selection.	Area. Acres.	Date Sown.	Seed Used. lbs.	Yield per Acre.		Weight of Bushel. lbs.
					Bush.	lbs.	
Bearded Gluyas	5th	14.753	May 11-13 ..	95	18	4	64½
College Eclipse	3rd	5.781	May 10-11 ..	88	16	51	64½
Queen Fan	1st	3.088	May 7	86	16	37	65
Carmichael's Eclipse	3rd	3.941	May 9	88	16	34	64
College Comeback ..	2nd	2.895	May 8	90	16	6	67½
Late Gluyas	5th	2.659	May 6	92	14	55	64
Marshall's No. 3A ...	3rd	1.379	May 3-4	84	13	49	63½
King's Red	5th	15.635	May 13-14 ..	95	13	28	65½
King Fan	1st	1.123	May 2-3	91	11	46	61½
Field average ...		51.254			15	48	

DAHLITZ.

The total cropping area of this field is 44-365 acres. In 1912 portion of it was under hay, portion under barley, portion under oats, and portion was occupied by the hand selection plots. In addition to this, 14-852 acres were under small areas of special wheats, many of which are new varieties of our own creation. It is with these varieties that we are now concerned,

The past history of this field may be summarised as follows:—1899, purchased and fallowed; 1900, wheat; 1901, bare fallow; 1902, wheat and oats; 1903, barley; 1904, pease; 1905, oats; 1906, wheat; 1907, rape; 1908, bare fallow; 1909, wheat; 1910, pasture; 1911, bare fallow; 1912, wheat, barley, and oats.

I append below in Tables XVI., XVII., and XVIII. detailed statements concerning the varieties of wheat grown in Dahlitz.

TABLE XVI.—*Showing Returns from Some New College Wheats (1907 and 1908 Crosses).*

Varieties.	Nature of Cross.	Area. Acres.	Yield per Acre.	
			Bush.	lbs.
Caliph	Marshall's No. 3 x King's White	0-090	28	20
Anvil	King's White x Jonathan	0-132	26	16
Bijou	Marshall's No. 3 x Fan	0-183	23	35
Canaan	Jonathan x Fan	0-050	23	20
Basil	Fan x Red Fife	0-184	23	0
Iguano	Gluyas x Fan	0-359	21	41
Daphne	Late Gluyas x Fan	0-070	20	14
Caddie	Jonathan x Farrer's 52	0-040	18	20
Cadet	Jonathan x Farrer's 52	0-030	17	47
Brindle	Carmichael's Eclipse x Red Fife	0-051	13	4
Fancy	Fan x Comeback	0-070	10	43

TABLE XVII.—*Showing Returns from Latest Strains of College Pedigree Selected Wheats.*

Varieties.	Selection.	Area. Acres.	Yield per Acre.	
			Bush.	lbs.
Beardless Odessa	1st	0-025	42	40
Lamda	7th	0-032	28	39
Bearded Gluyas	7th	0-086	28	6
King's Red	7th	0-436	27	34
King's White	7th	0-328	26	53
White Tuscan	1st	0-025	26	0
Jonathan	4th	0-196	24	55
Petatz Surprise	2nd	0-196	24	9
Late Gluyas	7th	0-236	23	44
Queen Fan	3rd	0-352	23	6
Carmichael's Eclipse	5th	0-541	22	53
Wilmington	2nd	0-481	22	21
Federation	4th	0-114	22	13
College Eclipse	5th	0-532	21	54
Beardless King	2nd	0-054	21	36
Marshall's No. 3B	5th	0-551	21	36
King Fan	3rd	0-489	21	34
Gluyas	7th	0-295	21	32
Beardless Odessa	2nd	0-063	20	22
Petatz Surprise	1st	0-206	19	35

TABLE XVII.—*continued.*

Varieties.	Selection.	Area. Acres.	Yield per Acre.	
			Bush.	lbs.
White Tuscan	2nd ..	0.063 ..	18	31
Cape Wheat	2nd ..	0.229 ..	18	20
Cape Wheat	3rd ..	0.177 ..	17	36
Yandillah King	1st ..	0.215 ..	17	27
College Comeback	5th ..	0.341 ..	17	27
Huguenot	1st ..	0.023 ..	16	40
Fan	5th ..	0.515 ..	15	36
Marshall's No. 3A	5th ..	0.452 ..	13	54
Gluyas	6th ..	0.324 ..	13	13
Huguenot	2nd ..	0.047 ..	10	38
Beardless King	3rd ..	0.525 ..	9	35

TABLE XVIII.—*Showing Miscellaneous Wheats Grown in Dahlitz.*

Varieties.	Remarks.	Area. Acres.	Yield per Acre.	
			Bush.	lbs.
Marshall's Dorath	—	0.535	25	59
Marshall's Prolific	—	0.562	24	44
Golden Chaff	—	0.013	21	25
Egyptian	Imported from Egypt ..	0.443	20	44
Bartlett's Crossbred	—	0.082	20	7
Sutton's Prolific	—	0.449	18	40
Dymenos	Imported from Greece ...	0.446	14	5
Tresor	Imported French wheat ..	0.113	12	41
Briquet Jaune	" ..	0.112	12	39
Bordier	" ..	0.111	12	10
Dattel	" ..	0.112	10	25
Champlan	" ..	0.112	10	16
Grosse Tete	" ..	0.112	9	40
Bobs	—	0.464	9	20
Lamed	Imported French wheat ..	0.113	9	9
Crossbred 53	—	0.676	8	45
Massy	Imported French wheat ..	0.112	7	35
Mahmoudi	Imported African wheat ..	0.437	7	31
Adjini	" ..	0.440	7	25

It should be stated, of course, that overmuch importance cannot be attached to the yields calculated from mere fractions of an acre. These small plots, however, are essential to us as the stepping-stones to larger areas in years to come. It may be stated that it is absolutely impossible to get pure seed of any kind unless one starts originally from a few heads, and from them passes to small plots of the kind placed in Dahlitz in 1912.

The total area under wheat in this field was 14.852 acres, and the average yield per acre recorded 18bush. 19lbs.

GRAINGER CULTIVATION PLOTS.

In 1911, I determined to divide up a field into a series of plots (a little over 4 acres in area) with the object of testing over a series of years the influence on the wheat crop of various methods of handling bare fallow in the year that precedes the sowing of the crop. These plots have been represented in duplicate in a field between 49 and 50 acres in area, one-half of which will each year be under crop, whilst the other half will be treated as bare fallow.

The general scheme adopted for the purpose is shown below.

EARLY FALLOW.

Plot 1 (A and B).—Ploughed 7in. deep and immediately rolled with heavy roller. Cross cultivated before September 1st, and harrowed immediately afterwards. Cultivated and harrowed subsequently as often as surface crust or weeds render it necessary.

Plot 2 (A and B).—Ploughed 7in. deep and immediately harrowed. Cultivated before September 1st and subsequently as often as found necessary.

Plot 3 (A and B).—Ploughed 7in. deep and cultivated three times during the course of the season. Harrowed at seeding time.

Plot 4 (A and B).—Ploughed 7in. deep. Cross skim-ploughed before September 1st and cultivated subsequently as often as necessary.

LATE FALLOW.

Plot 5 (A and B).—Ploughed 7in. deep after 1st of September and heavily rolled same day as ploughed. Cultivated not later than three weeks after rolling, and, if possible, after rain. Rolled a second time, and cultivated or harrowed, or both, according to the condition of the tilth. Thorough tillage throughout.

Plot 6 (A and B).—Ploughed 4in. deep after 1st of September. Cultivated after the fall of rain, and subsequently as often as necessary.

It will be noted that in this scheme it is proposed, in the first place, to ascertain the relative values of early and late fallowing. Secondly, in the matter of the general treatment of early fallow, the relative values of such practices as heavy rolling immediately after ploughing (plot 1); of harrowing immediately after ploughing (plot 2); of leaving the land in the rough state during the winter months and cultivating in spring (plot 3); of giving the ploughed fallow land a second shallow ploughing with a multi-furrow skim plough (plot 4); and thirdly, in the matter of the general treatment of late fallow, the relative value of continued deep ploughing accompanied by heavy rolling (plot 5), compared with that of comparatively shallow ploughing, in which the land is subsequently only cultivated and harrowed (plot 6).

It should be stated that, strictly speaking, in 1912 these cultivation plots gave no example of what might really be called true early fallow. The plans for this experiment were made rather late in the season, towards the end of the fallowing season, with the result that the breaking of the early fallow plots took place between August 24th and September 6th, which, it must be acknowledged, is rather late for early fallow. In future years it is intended that the early fallow plots shall be broken in the month of July, and as early as circumstances otherwise permit of.

Full details concerning the general treatment, seeding, and harvest returns of these six plots are shown below in Table XIX.

TABLE XIX.—*Showing Returns from Grainger's A Cultivation Plots.*

Plots.	Treatment of Fallows.	Date of Sowing.	Yield per Acre.		Weight of Bushel. lbs.	Weight of Straw to 60lbs. of lbs.
			Grain. Bsh. lbs.	Total Produce. T. c. L.		
1A	Ploughed 7in. deep August 24-26; rolled Aug. 29-30; cultivated Sep. 9, Oct. 2-4, Jan. 10, April 10, and May 10; harrowed Sep. 11 and April 11.	May 10	20 44	1 15 104	67½	134
2A	Ploughed 7in. deep Aug. 26-30; harrowed Sep. 1 and Dec. 8; cultivated Sep. 9, Oct. 2-4, Jan 11, and May 10.	May 11	22 45	1 17 43	67½	124
3A	Ploughed 7in. deep Aug. 30-Sep. 4; cultivated Oct. 2-4, Jan. 11, and May 11; harrowed Dec. 8.	May 13	20 31	1 13 100	67½	125
4A	Ploughed 7in. deep Sep. 4-6; cross skim-ploughed Sep. 12; cultivated Oct. 2-4, Jan. 11, and May 11; harrowed Dec. 8.	May 14	22 16	1 17 40	67½	128
	Mean Yield of early fallow plots	—	21 34	1 16 16	—	—
5A	Ploughed 7in. deep and rolled the same day, Sep. 19-21; rolled again Oct. 7; cultivated Oct. 2-4, April 10, and May 11; harrowed Oct. 11, Dec. 8, and April 11.	May 14	22 45	1 19 19	68	133
6A	Ploughed 4in. deep Sep. 22-26; cultivated Oct. 2-4 and May 13; rolled Nov. 28; harrowed Dec. 8	May 15	16 27	1 6 88	67½	122
	Mean yield of late fallow plots	—	19 36	1 12 110	—	—

The variety of wheat sown in these cultivation plots was College Comeback of the 3rd selection. It was sown at the rate of 95lbs. of seed to the acre with 2cwts of superphosphate. All six plots germinated regularly and well between the 21st and 27th of June; all were practically in bloom by October 26th; and all ripened off fairly close together between November 29th and December 2nd.

The results summarised above in Table XIX. are no more than first year's results, and undue importance should not be given them. Nor should it be overlooked that what are in this instance described as early fallow plots were in 1911 broken up later in the year than will be the case in the future. Subject to these reservations the following remarks are permissible:—

(1) That the average grain yield of the early fallow plots was just about 2bush. higher than that of the late fallow plots.

(2) That the average yield of total produce (combined grain and straw) of the early fallow plots was about 3cwts. higher than that of the late fallow plots.

(3) That among the early fallow plots the best returns, both in grain and total produce were realised on plots 2A and 4A respectively ; the first of which was harrowed immediately after ploughing, and the second cross skim-ploughed shortly after.

(4) That of the two late fallow plots, plot 5A, which was ploughed up on a 7in. furrow and immediately pressed down with a heavy Croskill clod-crusher, was infinitely superior to plot 6A, in which shallower ploughing was adopted, but no use made of the roller until the end of November.

(5) That the individual yield of late fallow plot 5A was in grain quite equal to that of the best of the early fallow plots and in total produce decidedly superior.

Finally, in connection with these plots, I would call attention to the high bushel weight of College Comeback, which here varied between 67½lbs. and 68lbs. We have for several years past set ourselves the task of improving the yielding properties of this excellent wheat, and I think that I may say that we have every reason to believe that we have gone a long way towards achieving our object.

THE GRAINGER'S B DEPTH OF PLOUGHING PLOTS.

These depth of ploughing plots were first established in 1910. Their aim is to endeavor to determine what is, under our conditions of climate, the influence of depth of ploughing in the preparation of fallow land on the growth and yield of the wheat crop. Naturally enough definite conclusions on the subject cannot be drawn until we have before us the results of several seasons. In the meanwhile we must content ourselves with recording what results we have.

These plots are represented by six pairs of plots, numbered 1 to 12. In 1911 the odd numbers were under crop, whilst the even ones were treated as bare fallow. In 1912, the second season, we have to record the position is naturally reversed. The depth of ploughing adopted at fallowing time is 2in. in the case of plots 1 and 2 ; 4in. in that of plots 3 and 4 ; and so on for each successive pair of plots, the depth increasing regularly by 2in., the maximum depth tested being 12in. for plots 11 and 12. The wheat sown in these plots was, in 1912, King's White of the 5th selection. It was sown at the rate of 90lbs. of seed to the acre with 2cwts. of superphosphate.

These plots germinated rather unevenly between June 18th and 29th ; the plots that were shallow ploughed were the first to germinate. Unfortunately, too, malting of the grain was somewhat pronounced in some of the plots and led to a good deal of irregularity of growth. Flowering took place on October 8th for plots ploughed between 2in. and 6in. deep, and October 10th and 11th for the other three. The 2in. plot was ripe on November 17th, the 4in. and 6in. plots on November 20th, the 8in. plot on November 22nd, and the 10in. and 12in. plots on November 24th.

Full seeding and harvesting details concerning these plots are shown below in Table XX.

TABLE XX.—*Showing 1911 and 1912 Returns from Grainger's B Depth of Ploughing Plots.*

Plots.	Depth.	Grain per Acre.				Total Produce per Acre.				Mean of Two Years.				Weight of Bushel, 1912.
		1912.		1911.		1912.		1911.		Two Years.		Two Years.		
		In.	Bsh. lbs.	Bsh. lbs.	Bsh. lbs.	T. C.	L.	T. C.	L.	T. C.	L.	T. C.	L.	
1 & 2	2		19 11	19 34	19 23	1 13	64	1 18	94	1 16	21	1 16	21	63½
3 & 4	4		21 27	27 10	24 19	1 16	58	2 3	84	2 0	15	2 0	15	63½
5 & 6	6		21 39	25 29	23 34	1 13	109	2 3	109	1 18	109	1 18	109	63½
7 & 8	8		21 21	28 23	24 52	1 12	56	2 6	78	1 19	67	1 19	67	63
9 & 10	10		21 41	27 23	24 32	1 14	37	2 4	72	1 19	58	1 19	58	63
11 & 12	12		22 55	26 32	24 44	1 13	79	2 6	58	2 0	12	2 0	12	64½

Any conclusions drawn from the results of two seasons would, I think, be premature. It may be observed, however, that the differences in the yields of the different plots were far more pronounced in 1911 than in 1912, and that for the present, so far as the mean yields are concerned, there is nothing much to choose between the various plots once we get beyond the 2in. depth of ploughing.

THE GRAINGER'S C SUPERPHOSPHATE PLOTS.

These superphosphate plots were first set going in 1909, the year in which the farm known as "Grainger's" first came into our hands. They consist of 15 plots, 2.82 acres in area each, split up into five series of three plots each. In each season one plot in each series is under crop, another treated as bare fallow, and the third as pasture. The plots of the first series are to remain permanently unmanured, those of the second series receive ½cwt. of superphosphate whenever they are under crop, those of the third series 1cwt. of superphosphate, those of the fourth series 2cwts. of superphosphate, and those of the 5th series 3cwts. of superphosphate. In one sense these plots are no more than duplicates of similar plots established since 1904 in the Permanent Experiment Field. The Grainger plots, however, present the advantage of having been placed on land which we know to have received very little superphosphate prior to 1909, whereas the corresponding plots of the Permanent Experiment Field form part of the old College Farm, which from the earliest days has been more or less heavily manured.

The results secured in these plots will be discussed fully later on in the general report dealing with the plots of the Permanent Experiment Field. Here, therefore, I shall content myself with setting out the 1912 results comparatively with those of preceding seasons. The plots below were sown on the 17th and 18th of May with King's White of the 5th selection at the rate of 90lbs. of seed to the acre. Germination was, unfortunately, unsatisfactory throughout the plots with the results that growth was somewhat irregular and yields rather low.

Full details concerning these plots are shown below in Table XXI.

TABLE XXI.—*Showing Returns from the Grainger's C Superphosphate Plots.*

Series.	Super-phosphate per Acre. Cwts.	Grain Yield per Acre.		Total Produce, 1912.			Yield per Acre. Means 1910-12.		
		1912.	Means 1910-12.						
		Bsh. lbs.	Bsh. lbs.	Tons	cwts.	lbs.	Ton	cwts.	lbs.
1	No manure	5 38	12 9	0	12	28	1	3	77
2	$\frac{1}{2}$	13 11	18 52	1	3	13	1	10	79
3	1	17 25	20 28	1	10	69	1	16	80
4	2	16 43	20 25	1	8	109	1	17	68
5	3	19 18	21 15	1	12	58	1	18	109

Attention may be called to the very low returns from the no-manure plot in 1912. This is strictly in accordance with similar results obtained by us in other years. Whenever we are faced with a season in which wheat is able to ripen off slowly and late in the year, unmanured crops, like late varieties of wheat, frequently yield almost as well as the most heavily-manured plots. When, however, the season closes early, or when the growing period is short, as was the case in 1912, unmanured crops are invariably much inferior to crops dressed with superphosphate.

As instancing the influence of superphosphate in hastening the ripening of the crop, and so, in a measure, enabling it to grow on a smaller moisture supply, the following figures should be noted in Table XXII.

TABLE XXII.—*Showing the Periods of Vegetation of Crops Variously Dressed with Superphosphate.*

Series.	Super-Phosphate per Acre. Cwts.	Dates of			Number of Days between Germination and Ripening.
		Germination.	Flowering.	Ripening.	
1	No manure	June 29	October 22	December 4	158
2	$\frac{1}{2}$	June 29	October 19	November 24	148
3	1	June 29	October 18	November 22	146
4	2	June 29	October 15	November 20	144
5	3	July 1	October 15	November 20	142

THE PERMANENT EXPERIMENT FIELD.

Finally, we have the plots of the Permanent Experiment Field, a full report concerning which will shortly be published. In this field there was an area of 54.1 acres under wheat, which gave an average yield of 20bush. 10lbs. to the acre.

THE 1912 GENERAL FARM AVERAGE YIELD OF WHEAT.

We reaped 4,564bush. 37lbs. of wheat from 232.89 acres; this represents a general average yield of 19bush. 36lbs. to the acre. On the whole, when the general character of the season is taken into consideration, and the fact that much of our wheat is grown under experimental conditions, it will be agreed,

I think, that the season's yield is fairly satisfactory ; far better, indeed, than we ever anticipated in the earlier part of the season. I append below in Table XXIII., comparative data concerning the average general yields of which we have record.

TABLE XXIII.—*Showing the Average General Yield of Wheat on the College Farm, 1904-1912.*

Season.	Rainfall.			Area under Wheat. Acres.		Average Yield of Grain. per Acre.	
	"Useful." Inches.	Total. Inches.				Bush.	lbs.
1904	11.60	14.70	..	330.00	..	18	3
1905	14.23	16.71	..	212.00	..	24	11
1906	16.30	19.72	..	318.00	..	14	30
1907	13.81	15.05	..	178.00	..	13	20
1908	15.53	17.74	..	258.52	..	22	14
1909	21.15	23.05	..	328.47	..	25	5
1910	16.79	23.87	..	267.35	..	16	38
1911	9.46	13.69	..	234.98	..	14	17
1912	13.05	14.97	..	232.89	..	19	36
Average yield of nine years						18	39



SETTLER'S HOME ON THE MURRAY.

FARM ANIMALS.

DISEASES OF THE FOOT (HORSE).

By C. A. LOXTON, G.V.M.C., Assistant Government Veterinary Surgeon.

As foot lameness is an exceedingly frequent cause of unfitness for work, a knowledge of its most common causes is of importance to owners of horses. The value of the horse depends almost entirely upon his capacity for work, therefore sound feet are necessary. So frequently is lameness referable to the foot that in cases where the seat of the trouble is doubtful the shoe should be removed and the foot examined; especially is this the case in lameness of the fore leg. Some diseases, such as canker, result in considerable alteration in the structures affected, and are easy of diagnosis. Others, again, require a thorough and careful examination of the foot for their detection.

The symptoms of foot lameness are fairly characteristic. When at rest the affected foot is relieved of weight. This is seen in the upright position of the pastern, or the animal may "point" with the lame foot. When the pain is severe, he may rest the foot on the toe, or even hold it up off the ground at intervals. The foot may be hot and tender, and tapping with a hammer may cause pain. The diseases most frequently requiring attention are wounds and other injuries, quittor, sandcrack, false quarter, corns, laminitis, canker, and thrush.

WOUNDS AND INJURIES.

CLOSE NAILING.

Close nailing (the nail being driven too close to the sensitive structures) may result from carelessness on the part of the shoeing smith, or from defective nail holes in the shoe. There is lameness immediately, or shortly after shoeing. Examination may show that one of the clenches is unnecessarily high. If the shoe is removed it will probably be seen that a nail hole is inside the white line.

Treatment.—As the trouble ceases when the pressure of the offending nail is removed, the shoe may be replaced, leaving the particular nail out.

PUNCTURED WOUNDS OF THE FROG AND SOLE.

The most frequent causes are pricks in shoeing. During shoeing the nail may be given a wrong direction by coming in contact with the stub of an old nail; more rarely the sensitive structures are injured by the splitting of a nail. Wounds also result from treading upon sharp objects, nails, &c. Sometimes these injuries are very serious, the pedal bone or the coffin joint being implicated.

Symptoms.—When sudden lameness occurs an examination of the foot may reveal the offending object, which is at once removed. More often lameness is not present until a day or two has elapsed, when pus formation has taken place. In cases of pricks in shoeing the animal usually returns lame from the forge. There is tenderness in putting the foot to the ground. The foot is usually hot, and the animal flinches when the foot is tapped with a hammer. Sometimes the pincers are necessary to locate the trouble. In order to find the point of injury it may be necessary to pare away the horn, when the discoloration of the horn will show where the injury has taken place. Gathered nails usually pierce the point of the frog. The shoe nail holes should all be examined.

Treatment.—Usually when the injury is discovered immediately and the cause removed, no further trouble occurs, the wound not being infected and being superficial in character. In some cases, however, suppuration takes place, and lameness increases from the time of the injury. The puncture must be looked for, and when found the horn should be removed with a searcher, and a funnel-shaped opening made to allow the discharge to escape. The wound should be syringed out with a disinfectant solution, such as carbolic acid 5 per cent. Poultices are often used to soften the horn and relieve the pain, or the foot may be placed in a bucket containing some antiseptic solution, such as 2 per cent. creolin. The wound should be kept clean by covering with a pad of tow, and the foot placed in a clean bag. Plenty of good dry bedding should be provided. As soon as lameness has disappeared, shoe with a piece of leather under the shoe, and pack with tarred tow.

TREADS, OVER-REACH.

Injuries to the coronet, usually accompanied by more or less bruising and laceration of the tissues.

A tread is an injury to the coronet inflicted by the shoe of the opposite foot, or by the shoe of another animal in a team. Over-reach is an injury to the heel of the fore foot by the shoe of the hind. Occasionally a wound is present, with inflammatory swelling. The foot is more or less hot and tender, and accompanied by lameness. Injuries in the region of the coronet should receive attention, as they are, if neglected, often a cause of sandcrack, false quarter, and quittor.

Treatment.—Clip off hair; wash with 5 per cent. carbolic acid solution; dust with wound powder, such as zinc oxide; keep clean by applying a bandage.

QUITTOR.

A fistulous wound at the coronet, in which there is one or more openings communicating with one another.

Quittor is usually the result of some injury in the region, or may be due to a suppurating corn, or wounds of the foot in which the pus has found its way out at the coronet. There is a chronic inflammation of the part, with more or less swelling, heat, and lameness, and a discharge of pus from several openings at the coronet.

Treatment.—Often an important structure is involved which adds to the difficulty of treatment. If due to a suppurating corn, an opening must be made in the sole to allow the pus to escape. In all cases it is necessary to provide for the free escape of discharge and dead tissue, and to wash the channel out with some antiseptic solution daily. Quittors are very refractory to treatment, and bad or old standing cases require skilled attention. Prevention consists in the proper care of any wound of the coronet, as described in the paragraph on Treads.

FALSE QUARTERS.

A fault in the horn at any part of the wall, but usually at the quarter, the defect being due to injury of the horn-secreting structures at the coronet. There is a shallow groove in the horn of the wall extending downwards from the coronet.

Treatment.—As the horn-secreting tissue is destroyed curative treatment is impossible. Proper attention must be paid to the shoeing, for which a bar shoe is recommended.

SANDCRACK.

A crack in the wall extending downwards from the coronet. In the front foot usually occurring at the quarter, and in the hind foot at the toe. Horses with brittle feet are liable to sandcrack. Cracks extending upwards from the edge of the wall are often seen in unshod feet that are not attended to.

Treatment.—To induce the growth of sound horn from the coronet, movement between the edges of the crack must be prevented. If there is lameness, due to the movement of the horn at the crack, it should be cleansed thoroughly and may be poulticed for a day or two. Movement of the crack is checked to a certain extent by cutting or burning a groove on each side of it in the form of the letter V, or where incomplete it may be prevented from extending by making a groove across the wall just below it. The most satisfactory method of fixing the edges of the crack is by clasping them together. For this purpose a special instrument is made, but the same purpose is served by cutting away a portion of the horn on each side of the

crack so as to allow a horseshoe nail to be driven through from one side to the other. The head and point of the nail are then removed and the ends of the shank turned over so as to form a clinch. Care must be taken in driving the nail so as not to wound the sensitive structures. One or more clasps may be required. A bar shoe is the best form of shoe for sandcrack. If the crack is at the toe the shoe should have a clip on each side of the crack instead of the usual toeclip. Relieve the horn of the wall of weight at the crack by paring it away slightly. A blister at the coronet will stimulate the growth of horn.

CORNS.

A corn is a bruise of the sensitive sole between the wall and the bar, usually in the forefeet and at the inner heel. The horn becomes discolored as a result of the bruising, and more or less lameness is usually present. Some feet are predisposed to corns—flat feet with low heels, contracted feet, and weak feet where the horn is thin. Thinning the horn at the sole, cutting away the bar, springing the heels, and shoes short at the heels are likely to lead to bruising of the sole at the seat of corn.

Treatment.—If lame, poultices may be applied to the foot for a day or two. Usually, however, lameness disappears if a suitable shoe is applied, and for the purpose a three-quarter shoe is advised. In the case of suppurating corns the horn must be pared away to allow the pus to escape.

LAMINITIS.

Popularly known as founder. Inflammation of the sensitive foot, particularly of the laminae. The disease most commonly affects both fore feet, sometimes all the feet are affected, and more rarely both hind feet only.

Causes.—Prolonged and fast driving on hard roads, overdriving when the animal is not in a fit state for severe exertion from excessive condition, or after a period of idleness. Excessive condition is a frequent cause in stallions. It is often caused by eating wheat, and occasionally after new hay or oats. Laminitis also occurs as a sequel to other diseases, and sometimes follows difficult foaling, influenza, or an overdose of physic. It is often seen among horses on board ship. Flat feet with weak heels and flat soles are predisposed to laminitis.

Symptoms.—In acute cases there is fever with quickened breathing, full pulse, and profuse perspiration. The animal is uneasy on his feet, and this is followed by a characteristic attitude depending upon which feet are affected. When both fore feet are affected the animal stands with his fore and hind feet as far forward as possible so as to throw the weight as much as possible on the hind feet, swaying backwards occasionally and throwing the weight on his heels. When all the feet are affected he stands in much the same position so as to throw his weight on his heels. When both hind feet are affected he stands with all his feet close together under the body so that the

fore feet will carry as much weight as possible. It is difficult to get the horse to move forward, and backing is also difficult. When made to move the action is short, jerky, and painful. The feet are hot, the animal shows pain if the feet are struck with a hammer, and the blood vessels can be felt throbbing at the fetlock.

The disease often causes structural changes in the feet, irregular rings on the wall, dropped sole, pumiced foot, and may render the animal permanently unfit for work. An attack of acute laminitis may lead to a mild chronic form of the disease.

Treatment.—The most effectual treatment for laminitis is the foot bath. The shoes should be removed and the patient made to stand in cold water up to the fetlocks for some hours daily as long as he is showing any tenderness in his gait. At night he should be placed in a well-bedded loosebox and encouraged to lie down. Give laxative diet, mash, and soft food. In the food or drinking water give daily two tablespoonfuls of Epsom salts and a teaspoonful of saltpetre. In the chronic form a special shoe is sometimes used— a shoe wide in the web and thinned out at the toes and heels.

THRUSH.

A disease of the frog, in which there is an offensive discharge. The cleft of the frog is first affected, and there is wasting of the frog. As a rule there is also contraction of the affected feet. Thrush is most common in draught horses. It is usually due to standing in dirty stables.

Treatment.—Cleanliness. Shoe so as to obtain frog pressure which will develop the frog. Dust daily with calomel.

CANKER.

A disease of the frog and sole, in which there is a soft and spongy condition of the horn, with a discharge of greyish-white evil-smelling material. The disease is most often seen in draught horses, the hind feet being most frequently diseased. The disease runs a slow chronic course, and lameness is not pronounced until the foot is badly diseased.

Treatment.—Persistent effort is necessary, and the case must not be considered cured until healthy horn is being secreted over the whole foot. All diseased horn must be cut away, but this may be done in several operations, as it must be discontinued as soon as bleeding takes place. The whole of the frog and sole should be swabbed over with pure formalin and the foot placed in a clean, dry bag. After this the foot should be dressed daily with a 10 per cent. solution of formalin. If improvement takes place the strength of the formalin may be reduced to 4 per cent. or 5 per cent.

ENGLISH BUTTER TRADE.

REPORT BY TRADE COMMISSIONER.

The following is an extract from the Trade Commissioner's Report to the Minister of Agriculture, dated London, January 15th, 1913: -

"The market for butter is still in a weak and unsatisfactory condition. With the cold spell that set in last Monday some of the sellers endeavored to get the market up a little, but immediately higher prices were mentioned buyers closed up at once. At the present time, choicest Victorian is being sold at 110s. to 112s. Having in view the most recent events in regard to the butter market, I am more than ever convinced that most drastic alterations will have to take place in regard to the shipping and marketing of butter, otherwise the time is not a great way off when those connected with the industry will get a rude awakening. I find that margarine is getting a firmer hold on consumers every month, and unless some very prompt steps are taken, secondary butters at any rate, will not be wanted. The very high prices that butter was forced to last year have done incalculable harm, and it is the opinion of the best authorities here that the enormous increase in the demand for margarine is due to that cause alone. I am of opinion that it will be necessary to put the choicest butter on the retail counter in the neighborhood of 1s. per pound, and show a profit to the retailer, if we are to overtake the errors of previous seasons. I only hope, in the interests of the producers, that I may be wrong in my prognostications as regards what may appear to them to be low prices; but I can assure you it is not only my opinion, but that of very many with whom I have discussed the problem."

Writing under date, London, January 25th, the Trade Commissioner states - "I do not think I can express myself better than to state that the market during the past week has absolutely been topsy-turvy. Finest Victorian has been hawked at 106s. to 108s., and it appears to me that my prognostications in regard to the future are nearer realisation than I expected, as I believe before this season is out as low as 100s. will be accepted in order to clear stocks. The weather is certainly against us, but that is only a trifle; the real cause is undoubtedly the advance in the consumption of margarine."

SHEEP ON THE FARM.

By H. JACKSON, Instructor in Woolclassing, S.A. School of Mines and Industries.

South Australian farmers have an enviable reputation throughout the Commonwealth as wheat producers. This is evidence of the fact that they have listened with intelligence to and acted practically upon advice tendered them by those responsible for the furtherance, in an educational sense, of the agricultural interests of the State.

Generally regarded, South Australia is a wheatfield, and as such attains her greatest prominence upon the commercial horizon. At the same time she has a name for sheep that is becoming increasingly widely known by reason of the excellence in certain characteristics of the animals produced in the central districts of the State. It is to be noticed here that the country which is responsible for the production of the typical South Australian Merino is mostly good agricultural land; and even now, at the time of writing this article, some of the farmers' sheep-breeding stations are in a state of division into areas suitable for farming. In this connection there comes to mind the old saying that "What man has done man can do," and the thought occurs that, while the plough will soon break up the old pastures and the sheep paddocks give place to wheat fields, it need not necessarily mean eternal banishment for the "Beastie of the Golden Hoof."

While the wheat farmer is a welcome and valuable occupier of the land, we can still afford to remember that where wheat is growing now and will grow in the future wool grew in the past, under the condition in which the land was left by nature, and which for the most part were and will be the conditions when the farmer supplants the sheepbreeder. Having regard to this fact, it is not only logical, but correct, to reason that sheep and wool can still be more profitably produced in conjunction with and on cultivated areas than on virgin soil that has never felt the plough.

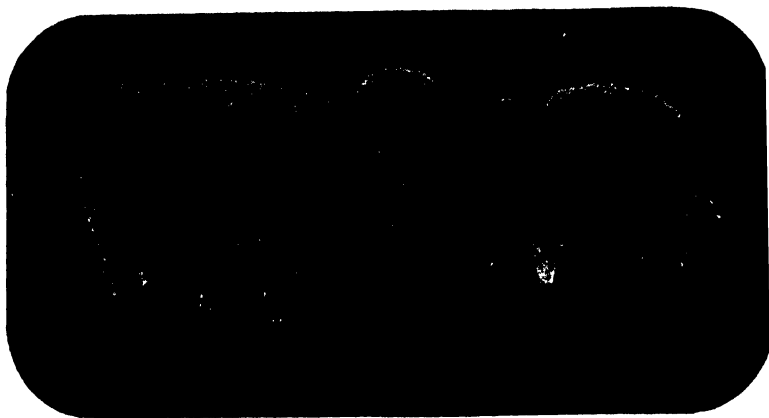
There are some wheat farmers who adopt a system of mixed farming, and find it pays to run sheep as well as practise agriculture. There are many, however, who confine themselves exclusively to grain production, with never a thought to spare for the "Jumbucks." Yet, by not having a few sheep about the place those referred to are losing, or, perhaps it is better to say, not benefiting, to the extent of scores of pounds sterling per annum through not taking advantage of the fodder which springs up in their stubble paddocks, and which could be easily converted into mutton of good quality at little or no cost to the farmer.

It can be admitted at once that wheat-farming alone is a payable proposition, and instances are fairly plentiful of men now independent who have reached that stage by means of the cereal only. This is very good, but possibly it could be better by a proper combination of sheep and wheat. At any rate, such a course would provide a second string to the farmers' bow in the shape of wool and, possibly, fat sheep. The value of these latter would be quickly appreciated if anything happened to prevent the coming to fruition and gathering of the wheat harvest, which may happen at any time and from various causes that do not in any way detract from the value of sheep or the weight of their wool clip.

These facts are worth considering by farmers who will find, if they only give the same attention to the subject as they have given to wheat, that, where the squatter formerly ran one sheep the farmer can probably run three or five at practically no expense and without in any way decreasing the wheat yield. More than likely the wheat harvest will be increased by the presence of sheep on the farm, for the value of sheep droppings as fertiliser is undoubted, and is automatically distributed by the animals themselves. Besides this, it has been often proved that wheat crops eaten down by sheep in the early stages of growth have given much better yields in bushels per acre and quality of grain than others not so treated.

To reiterate, while South Australia is pre-eminently a wheat State, she is also suited for sheep and wool growing, and a rational combination of both is likely to largely increase the cash returns that may be obtained singly from either.

(To be continued.)



POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

OPERATIONS FOR MARCH.

March is, or should be, with poultry breeders a busy month. The chief points to consider are—

AUTUMN BREEDING OF BOTH LIGHT AND HEAVY BREEDS.

This will necessitate careful selection of breeding stock, culling out all those which are too old or which are not ready for mating up. If the moult has not begun you can mate up some of the hens which are still laying and from these you will obtain, before they moult, a fair supply of fertile eggs. Use only second or third season hens, and mate with vigorous well-matured cockerels, or with young cock birds (under two years old). Do not breed from pullets. In exceptional cases pullets about a year old may be used, but the best results come from older stock. When the late moulting hens cease laying their places in the breeding pens may be filled with hens which have moulted and are again about to lay. The early autumn-hatched chickens will rear easily and will grow well if supplied with proper food. They will require plenty of cut green food daily, and therefore a supply should be maintained.

SUPPLY OF GREEN FOOD.

Green food is an important item in the bill of fare for all poultry. Grow a good variety, because each kind differs, not only as to food value but also as to its palatableness. Prepare ground for a continuous supply. It is a mistake to leave the preparation of the soil until the wet weather and short days are at hand. In growing green food for poultry the chief objects are large yields of succulent sappy growths and a fair variety, as some are better than others for supplying certain valuable constituents. Well worked, properly prepared, well manured soil will give good crops. Most soils are improved by digging or ploughing roughly, so that during a few weeks the hot sun may do its work. Then spread the manure and work down to a good tilth. Where small areas are concerned and a good water supply is available it is a good plan to water well, so as to germinate the seeds of useless weeds,

which can then be hoed or ploughed in. The following crops may now be sown :—

Berseem or Egyptian Clover.—This should be sown in March, and must be well irrigated to insure quick germination and to sustain growth until the natural rainy season arrives. This fodder has proved its value in the North, and will probably do well anywhere if sown now. It will provide a succession of cuts, and growth will extend until late spring. It is greatly relished by poultry.

Rape and Mustard are two very valuable fodders for poultry and are well suited to the small grower, and for planting in the poultry runs to sweeten the soil. Small plots may be grown under wire-netted frames. By this method the birds may pick at the growths without being able to scratch and so destroy the crops—a succession of crops may be thus grown.

Silver Beet.—This may be sown and transplanted later on. In early districts this course is advisable. In late, cool districts it is better as a summer crop sown in spring.

Kail. Thousand-headed is the prime favorite, although great yields may be obtained from Jersey tree and the French marrow kail—chou moellier. Sow in rich beds and plant out later on. Allow plenty of room—3ft. or 4ft. each way between the plants. The growth is surprising and the yield of succulent fodder enormous.

Lucerne has had its many virtues frequently explained. Every poultry breeder should have a plot, even if it be but a few square feet in area. Some poultry breeders complain that their birds prefer other green food to lucerne. Plant Arabian lucerne and your complaints will cease. If allowed access to the plots the birds will eat the plants right out, so fond are they of Arabian. During the winter months, especially in cold districts, lucerne makes little growth. The autumn sown lucerne germinates well and the roots obtain a good hold, and in spring and the following summer one may obtain fine results.

Clover.—Various clovers, particularly the red and the scarlet, will give good results, but, except in the cooler districts and in rich soils, is not so valuable for our breeders as lucerne.

Lettuce and Endive.—In many localities these may be easily grown and give fine returns. Both have valuable food properties. The endive in particular is very rich in mineral salts. Endives should be grown and used freely by all who wish to rear first-class stock.

Barley supplies a well-known, valuable, early green fodder. It is much liked by poultry, and many heavy cuts can be had from a small area. Skinless barley has a broad flag and is one of the best varieties.

Rye is one of the best early green crops. It has been grown for some years on the poultry stations. It yields many successive cuts and the birds eat it freely.

These are some of the principal fodders. The best results are obtained from small plots thoroughly attended to in all the details of cultivation.

YARDS AND HOUSES.

Now is the time to provide accommodation for the young stock. If you leave it until the yards are overcrowded you will meet many troubles and losses.

Build on a definite system. The general rule seems to be a lack of system. Odd corners are used for the yards and houses, and very often the main result is inconvenience. Build with a view to future requirements. You may adopt fixed or movable yards and houses.

If you tenant your land on uncertain lease you should build portable yards and houses, so that they can be easily removed in sections.

I am advising beginners to adopt what I term the "unit system." The system includes the breeding block, laying houses, and chicken-rearing plant. It is advised to adopt a standard which can be available for small or for large plants. This method meets the requirements of all who propose to build.

AUTUMN AND WINTER EGG PRODUCTION.

There are three essentials, viz., good housing, correct methods of feeding, good strains of layers. Housing comes first in order of importance. There have been hundreds of instances in which the stock has been of fine laying strain, and in which the feeding has been correct, but the housing has been woefully deficient. There is more than ample proof that close housing is essential to success as regards winter and autumn and even early spring egg production. On the scratching shed system the birds require comparatively little space. The constant occupation of scratching in the litter conduces to the best physical conditions. For egg production one feeds and houses for muscle, not for fat production. You cannot produce muscle without exercise. Only in exceptional cases do poultry on free range obtain sufficient exercise. This rarely is the case in cold wet weather. In addition to high and safe egg yields the birds are in comfort, and so is the attendant, who is then free from the usual muddy, unpleasant conditions common in wet weather. Whatever you do allow plenty of head room. The common practice, on the score of false economy, is to advise low-roofed, inconvenient structures. Build them of sufficient height, so that a man can enter them and work without being cramped and damaged.

TABLE-BIRD BREEDS.

Do not overlook the profits to be made by breeding table birds of good quality. Very high prices have been the rule for some long time. These prices will probably continue because there is a great shortage of suitable breeding stock. One finds very few breeders of Wyandottes nowadays, and yet good strains of these should be highly profitable. While it has been my practice to advise beginners to start with the egg-producing breeds, further advice has always been in the direction of table bird breeding later on. Do

one thing at a time. When your egg production branch is established you can then consider table bird production. At the new Parafield Poultry Station considerable attention will be given to this branch of the industry. Early hatching is profitable.

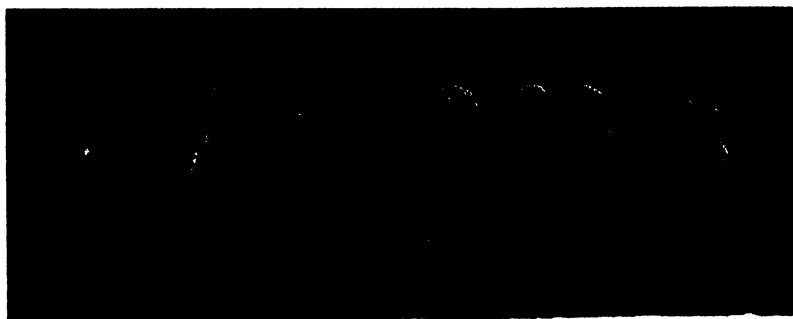
GENERAL.

Before the summer ends you should provide for use in winter a full supply of sand, charcoal, and grit (both hard and shell). Lay in a supply of straw and keep it well sheltered. Scratching material is essential. Order incubators, brooders, food dishes, &c. Delays may occur owing to stocks becoming depleted in the busy time.

The recent heavy rains no doubt have indicated all undesirable depressions in the yards. These should now be filled in or they will be puddles in the winter.

If you require lucerne hay chaff order it now, or you will probably have to go without. Farmers and others in the country should obtain proper egg cases. They save their cost soon and you have less trouble in packing and few losses from broken eggs. Market only new-laid eggs and wash all dirty-shelled eggs. Make a good name for high quality. Feed your stock on sound food—neither under feed nor over feed. Cultivate intelligent observation.

Eradicate all vermin. Infested poultry cannot thrive. Many species of vermin (parasites) are disease carriers. If in doubt write for information. Guard your birds from the depredations of foxes. Destroy these pests when you can. They are true vermin, and have no place in poultry breeders' economy.



NOTES ON EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

The fact that the birds at Roseworthy and Kybybolite are moulting without there being any marked effect upon egg production shows that our breeders are producing laying strains with strong constitutions. Reference is again made to oviduct troubles, and novice breeders are urged to discard all hens from the breeding pen if they show any signs of weakness in the organs of reproduction. When the reports of the recent heavy rain first came to hand it was feared that, even if the pens had escaped flooding, a serious check might be experienced. Fortunately no untoward events have to be recorded. The prospects of satisfactory averages again prove that large flocks of fowls, such as an average careful breeder might own, will, under proper conditions of housing and feeding, give highly profitable returns.

The Superintendent, Roseworthy, reports—

Health.—The birds are all in good order and condition, considering the time of the season.

Laying.—It is most gratifying to note that a downward tendency in egg production has not yet taken place. The output for the month has averaged 442 per day, or about 26 per day better than the daily output for January. With the present condition of the birds, and given a continuance of mild weather, the average of 180 per hen put up by the White Leghorns in last year's test will be easily eclipsed, and indications suggest that last year's average for all birds in the competition—178 for 758 hens—will also be beaten by the larger number of birds in the present test. The 804 birds have now an average of 169.6 and a month to go. It will be noted that Mrs. Uren's pen still holds the pride of place, with the pens running second and third in striking position, and it still is an open question as to who will be the winner. The inter-State birds are forging ahead, and some appear likely to make a good finish.

Weather.—With the exception of a few days, the weather during the month has been of a mild character, the exceptions being a sharp rise in temperature, which, fortunately, has not been sustained, and one very heavy rain. Conditions have settled to a moderate character quickly, and evidently have been favorable to the birds, as no effects of a detrimental nature have been noticed.

Broodiness.—The following numbers of broodies have been recorded:—Section I., 14; Section II., 70; Section III., 1; total, 85.

Deaths.—Deaths have occurred in Section I. as follows:—Two hens, which might be described as wasters, and are from a pen which has given considerable trouble at times during the whole period of the test. The lot in this pen appear to lack constitution; and 2 birds have died in other pens from oviduct troubles, total 4. One bird in Section II. had to be replaced owing to leg weakness.

Moulting.—Moulting is proceeding in a majority of the pens, the birds are casting their feathers well, and in nearly every instance the old feathers are quickly replaced by a good growth of new feathers. The moulting is not general, but appears to be carried on by one or two birds in a pen at one time. If mild weather continues this is, I think, a very desirable process, as the average egg production is not affected to any great extent. With a continuance of present conditions we may look forward to a not too protracted finish with good all round averages.

The Superintendent, Kybybolite, reports—

Health.—The general health of the birds has been good, though two deaths occurred. Death in both cases was due to troubles of the oviduct. Protrusion of the oviduct has been the cause of 95 per cent. of the deaths in this competition, and is more or less a weakness in the strain, as it is seldom that the heaviest layers have any trouble at all.

Moulting.—The moult is now taking effect on the birds, and their scoring is falling off considerably, though a few pens are doing good work, and by all appearances should put up a good score.

Weather.—The maximum shade temperature was 103°, with a minimum of 46°. Wind was registered on 16 days, some of which were very warm.

Broodiness.—In Section I. 10 birds had to be removed for broodiness, and 18 gave trouble in Section II.

D. F. LAURIE, Poultry Expert.

EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

ROSEWORTHY.

[Started April 1st, 1912, and to terminate March 31st, 1913.]

Competitor.	Eggs Laid for Month ended Feb. 28th.	Total Eggs Laid from April 1st, 1912, to Feb. 28th, 1913.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Cowan Bros., Burwood, N.S.W.	95	1,235
Tabuteau, J. O., Black Rock, Melbourne	100	1,065
Hodges, H., Pyalong, Victoria	108	1,168
The Range Poultry Farm, Toowoomba, Queensland	94	1,116
Brundett, S., Moonee Ponds, Victoria	116	1,240
Jessup, W. C., Caulfield, Victoria	109	1,122
Dawes, J. H., Granville, Sydney	83	1,229
Beadnall Bros., Gawler	103	1,262
Redfern Poultry Farm, Caulfield, Victoria	117	1,128
Kerr, R., Longwood, S.A.	84	1,229
Eckermann, W. P., Eudunda	116	1,181
McNab, J. A., Sandringham, Victoria	86	1,029
Mazey, P., Alberton	59	862
Broderick, P. J., Gawler	94	982
Redfern Poultry Farm, Caulfield, Victoria	110	1,093
Braund, J. E. and H. J., Islington	108	1,047
Dunn, L. F., Keswick	122	1,183
Hocking, E. D., Kadina	103	1,100
Groom, E., Peterhead	87	1,021
Pope, R. W., Heidelberg, Victoria	113	1,261
Haines, T. F., Fullarton Estate	76	941
Provis, W., Eudunda	118	1,125
Burton, W. S., Moonta Mines	91	1,063
Broster, G., Mallala	120	1,183
Brain, J. H., South Yan Yean, Victoria	76	1,085
Sargenfri Poultry Yards, East Payneham	108	1,296
McKenzie, H., Northcote, Victoria	103	1,245
McDonnell, J., Greytown, Rosewater	107	1,159
Browne, A. R., Hawke's Bay, N.Z.	100	1,210
Brain, J. H., South Yan Yean, Victoria	92	986
Marason, C., Welland	101	999
Hutton, C., Parkside	83	949
Miels, C. & H., Littlehampton	93	986
Moritz Bros., Kalangadoo	89	1,132
Codling, H., Mitcham Park	97	977
Troughbridge Poultry Yards, Edithburg, Y.P.	102	1,015
Irvine, A. W., Epsom, Auckland, N.Z.	62	964
Walker, P., HICKSBOROUGH, Victoria	100	1,044
Lampe, B., Kadina	96	844
Waite, F. J. O., Nailsworth	95	1,172

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Feb. 28th.	Total Eggs Laid from April 1st, 1912, to Feb. 28th, 1913.
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SECTION I.—LIGHT BREEDS—*Continued.*WHITE LEGHORNS—*Continued.*

Badcock, G., Mile End	90	995
McClelland, A., Mordialloc, Victoria	97	926
Tomlinson, W., Clarence Park	112	1,095
Roberts, L. L., Kadina	68	1,032
"Stratheona," Long Plain	99	1,120
Whitegate Poultry Farm, Deepdene, Victoria	102	1,041
Purvis, Miss Gracie, Glanville	101	1,129
Padman, A. H., Hyde Park	90	1,113
Sickert, P., Clarence Park	118	1,175
Purvis, W., Glanville	111	1,152
Rice, J. E., Cottonville	104	1,220
Hamill, H., Kogarah Bay, Sydney	102	1,068
Gurr, W. E., Kapunda	96	1,055
McLeish, E., North Adelaide	109	1,057
Craig Bros., Hackney	104	1,081
Uren, Mrs. P. A., Kapunda	98	1,336
Perry, Wm., Murrumbena, Victoria	80	966
Nancarrow, J. T., Port Adelaide	72	844
Bertelsmeier, C. B., Clare	91	1,107
Tockington Park Poultry Farm, Grange	82	1,103
Trenwith, T. H., Kadina	96	983
Knappstein & Bray, Clare	79	935
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	102	1,041
"Denehollow," Caulfield, Victoria	87	977
Hill, Chas., Monarto South	26	636
"Islay," East Malvern, Victoria	109	1,026
Cosh, A. J., Burnside	107	1,183
Indra Poultry Farm, Freeling	39	962
Whitrow, A. J., Knoxville	88	1,049
Hall, T. C., Rose Park	100	1,058
Ontario Poultry Farm, Clarendon	102	1,050
Howlett, H., Moonta	99	1,027
"Koonoowarra," Enfield	84	1,073
Hall, A. W., South Oakleigh, Victoria	119	1,274
Convent of the Good Shepherd, Oakleigh, Victoria	112	996
Carne, E. A., Kangaroo Flat, Victoria	115	1,143
Navan Poultry Farm, Minlaton	78	918
Lillywhite, R. G., Fullarton	91	1,114
Gibbs & Pine, Queenstown	105	867
Hughes, J. J., Elsternwick, Victoria	105	972
Shamrock Poultry Farm, Perth, W.A.	110	957
Bertelsmeier, C. B., Clare	96	1,060
Nancarrow, J. T., Port Adelaide	77	1,062

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Robertson, F. H., Northam, W.A.	55	732
McKenzie, E., Northcote, Victoria	77	788
Mitchell, B., Bendigo, Victoria	67	754
Provis, W., Eudunda	84	857
Kenway, D., West Pennant Hills, Sydney	77	952
Cowan Bros., Burwood, N.S.W.	88	1,003
Kenmore Poultry Farm, Dandenong, Victoria	65	726
Brundrett, S., Moonee Ponds, Victoria	75	884
Cant, E. V., Richmond	73	920

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Feb. 28th, 1913.	Total Eggs Laid from April 1st, 1912, to Feb. 28th, 1913.
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SECTION II.—HEAVY BREEDS—*Continued.*BLACK ORPINGTONS—*Continued.*

Craig, Mrs. C., Hackney	70	837
Lampe, B., Kadina	68	788
Wirraparinga Poultry Yards, Plympton	74	791
Phillips, A., Portland, S.A.	84	530
Martin, B. P., Unley Park	93	1,017
Nancarrow, J. T., Port Adelaide	24	490
Padman, J. E., Plympton	81	904
Francis Bros., Fullarton	87	764
Hall, T. C., Rose Park	93	942
Tockington Park Poultry Farm, Grange	81	814
Bertelsmeier, C. B., Clare	74	839
Craig Bros., Hackney	82	982
Bertelsmeier, C. B., Clare	82	834

SILVER WYANDOTTES.

Dunn, L. F., Keswick	68	988
Tidswell, H. J., Mitcham Park	43	742
Moyse, S., Blyth	60	741
Perry, Wm., Murrumbidgee, Victoria	58	747
"Denehollow," Caulfield, Victoria	65	834
Western, F. C., Marion	64	923

SALMON FATEROLLES.

Courtenay, K., Mordialloc, Victoria	66	878
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LANGSHANS.

Stevens, E. F., Littlehampton	94	992
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PLYMOUTH ROCKS.

"Koonoowarra," Enfield	79	639
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SECTION III.—SCRATCHING SHED SECTION.

WHITE LEGHORNS.

Sickert, P., Clarence Park	111	1,220
Tomlinson, W., Clarence Park	82	1,235
Moritz Bros., Kalangadoo	123	1,113
Codling, H., Mitcham Park	85	977
Sargenfri Poultry Yards, East Payneham	107	1,103
Purvis, W., Glanville	105	1,033
Bertelsmeier, C. B., Clare	106	1,118
Padman, A. H., Hyde Park	95	1,231
Hocking, E. D., Kadina	120	1,084
Headnall Bros., Gawler	113	1,013
Brain, J. H., South Yan Yean, Victoria	105	1,032
Provis, W., Eudunda	120	1,144
Radern Poultry Farm, Caulfield, Victoria	107	1,175
Broderick, P. J., Gawler	113	1,038
"Koonoowarra," Enfield	95	940
Lillywhite, R. G., Fullarton	104	1,069
Cosh, A. J., Burnside	87	955
Indra Poultry Farm, Freeling	104	1,058
Whitrow, A. J., Knoxville	110	1,074
Tockington Park Poultry Farm, Grange	85	1,086

KYBYBOLITE.

Competitor.	Eggs Laid for Month Ended Feb. 28th, 1913.	Total Eggs Laid from April 1st, 1912, to Feb. 28th, 1913.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	101	1,248
Dow, A., Glencoe West	17	1,037
McNamara, Mrs., Mount Gambier	51	951
Moritz Bros., Kalangadoo	134	1,446
"Mahama," Mount Gambier	104	1,190
Holmes, F. A., Frances	58	1,165
Sudholz, A., Kalangadoo	17	882
Staunton, S., Naracoorte	82	962
Hall, C. W., Mount Gambier	79	1,057
Moritz Bros., Kalangadoo	97	1,247
Vorwerk, K. E., Millicent	121	1,284
Vorwerk, H. F. & A. C., Millicent	112	1,174
Jarrad, J., Mount Gambier	66	1,082
Bartram, T. A., Kybybolite	67	1,129
Vorwerk, H. F. & A. C., Millicent	71	909
Jenkins, R. D., Kybybolite	83	949
Arthur, J. S., Bordertown	87	1,023
Drake, C., Naracoorte	88	1,054
"Eurinima," Kybybolite	88	1,155
Smith, M., Hynam	112	1,080
Lacey, F. C., Kybybolite	79	1,317
"Herdsfield," Mount Gambier	109	1,347
Blue Lake Poultry Farm, Mount Gambier	85	1,031
Beaton, W. J., Tantanoola	90	1,148
Bennett, E., Kalangadoo	121	1,025
Jones, H. F., Mount Gambier	55	937

MINORCAS.

James, S. T., Mount Gambier	88	837
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdsfield," Mount Gambier	100	1,094
Blue Lake Poultry Farm, Mount Gambier	16	579
McNamara, Mrs., Mount Gambier	68	626

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	49	776
Osborne, W. F., Kalangadoo	77	905

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	87	685
Glenelg River Poultry Farm, Mount Gambier	76	663

D. F. LAURIE, Poultry Expert.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, February 12th, there being present Messrs. A. M. Dawkins (Chairman), C. J. Valentine, J. Miller, C. J. Tuckwell, T. H. Williams, Col. Rowell, Professor Perkins, and G. G. Nicholls (Secretary).

Veterinary Lecturer.—A request was received from the Kalangadoo Branch of the Agricultural Bureau that a veterinary lecturer should be appointed for the districts between Adelaide and Mount Gambier. In view of the fact that it would be inadvisable to limit the scope of operations to any one district, the Board decided simply to recommend that an additional veterinary lecturer should be appointed.

Selling Cattle by Live Weight.—The Secretary of the Pastoralists' Association, in reply to a letter which had been sent by the Board, stated that his organization, after having consulted its members, had no objection to the proposed introduction of the system of selling fat cattle by live weight at the principal markets for a fair trial. It was agreed, at the instance of Col. Rowell, to forward the resolution of the Farmers' Congress, favoring the innovation, together with Mr. Riley's communication, to the Metropolitan Abattoirs Board for consideration, with a view to adoption or testing of the system at the abattoirs.

Butter Experiments.—Mr. Tuckwell said there were State experiment farms and orchards at which valuable investigations were being made for the benefit of the producers. There was also a Government butter factory, but it was not the scene of experiments. He thought, however, that the Board might well ask the Government to utilise the facilities which it offered for the purpose of ascertaining the best quantities of salt to employ in butter-making, and the effects of different quantities on the moisture content, as well as other useful facts. His own factory had experimented to a certain extent, but the Government had better opportunities to do the work. He proposed, therefore, that it should be requested to conduct certain experiments to be agreed upon, and to publish the results. The Chairman considered that Mr. Tuckwell was justified in bringing the matter forward, and that there was room also for a little microscopic work. The motion was carried.

New Branch at Two Wells.—The Board approved of the formation of a Branch of the Bureau at Two Wells, with the following gentlemen as members:—Messrs. L. H. Dawkins, T. H. Goss, J. J. McCord, R. Kenner, H. W. Kenner, A. Pratt, J. Rowe, J. Rowe, J. J. Secomb, W. S. Cordon.

New Members.—Minlaton—D. S. M. Davies ; Spalding—A. Howley, W. M. Martin, F. G. Sanders, P. Neill, J. Schlodder ; Wirrabara—O. Woodlands ; Naracoorte—A. J. Johnson ; Coorabie—C. W. Fox, W. J. Durbin, G. Menzel, W. Wheadon, jun., A. Riddle, G. Riddle, J. Bastian ; MacGillivray—F. H. Winch ; Meningie—C. Rickaby ; Forest Range—E. W. Dearman, G. Brockhoff, H. Trevenen ; Orroroo—E. J. Hook ; Hartley—B. Klaebesch ; Cradock—D. Fitzgerald ; Meadows—W. McKay ; Berri—W. F. Clayer, S. L. Hearne, E. G. Mitton, S. Herratt, W. Wade, C. Wade, J. Fiedler ; Lyndoch—F. W. Mattner ; Kadina—W. H. Donaldson, T. Roach, F. G. Brinkworth, G. Lamshed, W. Major, E. Wilton ; MacGillivray—A. Sands ; Frances—L. McInnes ; Wepowie—J. Rielly.

Life Members.—Messrs. L. W. Peake, D. McKay, and H. Ricketts, of the Penola Branch, were appointed life members of the Bureau in recognition of long and valuable service rendered to that institution and to the State.



MURRAY BRIDGE.

THE WHEAT HARVEST.

Revised Official Estimate.

Early in January the Government Statist (Mr. L. H. Sholl, C.M.G.) returned all the forecast reports furnished in November to the police collectors of statistics for them to make such amendments in the averages of wheat and hay production as might be necessary after the completion of the actual harvesting operations. With the exception of a few districts the reports have all been returned and the official forecast of November 27th last amended in accordance with the latest advices. The area of 2,229,890 acres for grain and 428,825 acres for hay has been adhered to, no better estimate being possible.

As will be seen by the summary below the wheat yield has been increased by 800,700bush., making the estimated yield 20,938,570, or 9·39bush. per acre; the average per acre being increased by ·36bush. The hay figures have not been revised, but the reports indicate the probability of an increase in the estimated average of 1·07 tons per acre.

SUMMARY OF REVISED ESTIMATE OF WHEAT HARVEST, 1912-13, COMPARED WITH FORECAST OF NOVEMBER 27, 1912.

Division.	Estimated Yield of Wheat.		Estimated Average per Acre.		Increase or Decrease.	
	As Estimated November 27th, 1912.	Revised Estimate January 31st, 1913.	As Estimated November 27th, 1912.	Revised Estimate January 31st, 1913.	Bushels of Wheat.	Average per Acre.
	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
Central	6,012,340	6,225,340	9·40	9·73	213,000	·33
Lower North..	6,765,200	7,027,200	11·83	12·28	262,000	·45
Upper North..	1,638,920	1,910,920	6·48	7·55	272,000	1·07
South-Eastern	2,634,370	2,922,870	8·47	8·98	158,500	·51
Western	3,087,040	2,982,240	6·80	6·57	-104,800	-·23
Grand Total	20,137,870	20,938,570	9·03	9·39	800,700	·36

PARAFIELD WHEAT STATION.

HARVEST REPORT, 1912.

As we have already stated, the wheat improvement work carried on at Parafield during the past few years will in future be conducted at Turretfield, where the larger areas and other conditions offer greater facilities for this special work.

The report of the last harvest from Parafield as a wheat station has been supplied by the manager (Mr. G. H. Stevens), as follows:—"The season has been a most remarkable one, characterised by the almost entire absence of rain at the period when it was most needed, and it promised to be one of the very worst in the history of the State. Opportune precipitations during the growing period, however, saved the situation, and the returns secured are very gratifying. The following shows the distribution of rain recorded at Parafield during the year: January, 0.21in.; February, 0.26in.; March, 0.87in.; April, 0.83in.; May, 0.27in.; June, 2.92in.; July, 2.30in.; August, 2.34in.; September, 3.78in.; October, 1.21in.; November, 1.98in.; December, 1.77in.; total, 18.74in. The total area under crop for grain, exclusive of hand plots, was 43 acres. A block of 27 acres of this area, however, is not permanently attached to the Parafield farm proper, but has been leased for a term of years with the idea of augmenting the output of seed wheat for distribution to farmers. On this land the results have not approached those obtained on the other parts of the farm. This may be accounted for by the fact that the department had no control over the cultivation of the land prior to its being taken over by the department two years ago, and consequently we have had to work under serious disadvantages. Oats and weeds springing up amidst the crop, the outcome of indiscriminate fallowing, affected the results considerably, and in justice to that area which truly represents Parafield, the average yields of the farm, with and without the inclusion of the results from that area under leasehold, are submitted."

Paddock Results.

Seeding operations were commenced on May 9th, and completed by May 31st. Seed was sown at the rate of 60lbs. to the acre, and the dressings of

super. were as follows:—Paddock No. 1, 150lbs. of super. to the acre; Nos. 4 and 5, 180lbs.; and Whitbread's, 200lbs. per acre. Paddock 5 was in barley and peas last year for green feed, and was dressed with farmyard manure. It was autumn ploughed, rolled and harrowed, drilling operations following immediately after. The subjoined table summarises the yields:—

Paddock No. 1.

	Per Acre.
Bunyip	30bush. 10lbs.
Firbank	25bush. 32lbs.
Gluyas	22bush. 4lbs.
Cumberland	32bush. 54lbs.
Triumph	27bush. 9lbs.
Comeback.....	22bush. 29lbs.
Crossbred No. 53	20bush. 32lbs.
Correl's No. 7	26bush. 46lbs.
Marshall's No. 3	33bush. 59lbs.
American No. 8	26bush. 11b.
Yandilla King	30bush. 32lbs.
Genoa	23bush. 34lbs.
Huguenot	21bush. 52lbs.

Paddock No. 4.

Thew	23bush. 15lbs.
King's Early	27bush. 49lbs.
King's White	23bush. 47lbs.
Bayah	20bush. 41lbs.

Paddock No. 5.

Thew	24bush. 52lbs.
King's Early	30bush. 30lbs.

Whitbread's.

Federation	14bush. 58lbs.
Bayah	14bush. 39lbs.
Thew	12bush. 40lbs.

It may be mentioned that, but for severe hot winds, which were experienced one afternoon, the yield from Crossbred No. 53 would have been much higher; the numerous sparrows, also, were responsible for some loss, Crossbred No. 53 and Huguenot in particular suffering by their ravages. The average yield per acre of the farm proper (excluding Whitbread's) is 26.11bush. The average for the whole area under crop for grain is 15.16bush. per acre,

CROSSBRED PLOTS.

These consist of small hand plots of the different varieties used in the production of new wheats, and also the various generations of the crossbreds themselves. In the season under review some 300 chain-length rows of home and foreign varieties were planted, from which to select for breeding purposes, and also numerous crosses in process of fixation. Some of these showed very great promise, Stanley x Viking and Stanley x Gamma particularly displaying the characteristics for which the wheatbreeder seeks, while others also should prove superior to many varieties at present in general cultivation. Fifty-four new crosses were made during the year, and attention will be devoted to the fixation of the best of these in the next and succeeding seasons. A number of varieties of oats, imported from England, were also sown. These have not yet become acclimatised, but when they do, they should prove very helpful to the production of new varieties, more prolific, and maturing earlier in the season than those at present favored by farmers.

HAY CROP.

The hay crop was comprised of wheat and oats mixed, sown in each case at the rate of 60lbs. of wheat with 40lbs. of oats. Dun oats were used, associated with the three varieties of wheat, viz., Correl's No. 7, White Tuscan, and Yandilla King. The yield of hay was $2\frac{1}{2}$ tons per acre. The pickle used throughout was formalin—in the proportion of 1lb. of formalin to 50galls. of water, and the absence of bunt and loose smut indicated that this is an excellent preventive for loss by these diseases. Applications for graded seed wheat are again very numerous, and it is encouraging to see that farmers are realising the fact that the use of carefully-selected and graded seed will greatly increase the efficiency of the wheat-growing areas.



THE WHEAT MARKET.

Under date January 24th, *Beerbohm's Evening Corn Trade List*, commenting on the wheat position, states—"The wheat market has been much quieter during the past week, and, with the exception of Indian, which is held for full prices and very sparingly offered, owing to the continued drought in the Punjab and some other districts, most descriptions are 3d. to 6d. lower. Private cables state that, unless rain comes immediately, the wheat crop in the Punjab will be appreciably smaller than last year, when the yield amounted to 17,200,000 quarters. On September 20th last we printed a statement of the estimated requirements and shipments for the season ending July 31st next, showing a surplus of 5,000,000 quarters. In that statement a very fair allowance was made for the loss in flour production of much of the European wheat owing to the bad condition in which it was harvested. The situation has become somewhat clearer as time has gone on, especially with regard to the yields of the Argentine and Australian crops. There is, however, still much uncertainty felt with regard to the quantity of wheat produced in importing countries unfit for milling, and in submitting a fresh estimate to-day of the world's requirements for the season, we allow for a reduction of 10 per cent. in the wheat grown in France and of 15 per cent. in that grown in the U.K., Germany, Holland, and Belgium on account of inferior quality. It will be seen that, notwithstanding the allowance made, owing to the unfavorable harvest weather in Europe, the surplus shown in the latter statement is the same as in the earlier one. This is owing to the American crop having proved to be much larger than at first estimated, and to the Argentine crop also having been a better one than then allowed for. The American crop is 13 million quarters larger than in the previous year, when 10 million quarters were exported, but we allow only for 8 million quarters to be shipped more than last season; the actual quantity will depend to some extent on the prospects of the next crop. Rain is urgently wanted in some parts of India, and if it does not come this month shipments from that country may be less than estimated, although there are still fair reserves of old wheat left. Russia has exported on such a small scale so far that we have reduced the quantity as likely to come from that country by 2 million quarters, although up to the present there has been no reduction made in the estimate of the yield. The yield of the Canadian crop has been variously estimated at 25 to 27 million quarters. The home consumption is about 8 million quarters, so that Canada can easily spare 15 million quarters.

With regard to the importing countries, the production of wheat in the U.K. available for human consumption is estimated at 6 million quarters (the official estimate gave a total crop of 7,100,000 quarters). In France the total yield was 42 million quarters, from which we have deducted 4,200,000 quarters on account of inferior quality. This would leave a balance of 37,800,000 quarters. The consumption for 11½ months is about 41,750,000 quarters, making the requirements of foreign wheat 3,950,000 quarters. The official estimate for the German crop was 20 million quarters, from which we have deducted 3 million quarters (15 per cent.) for inferior quality. The following is our revised statement:—

ESTIMATED REQUIREMENTS.		REVISED STATEMENT.		ESTIMATED SHIPMENTS.	
	Qrs.				Qrs.
United Kingdom	28,000,000	Russia			16,000,000
France	4,000,000	United States			18,000,000
Germany	10,000,000	Canada			15,000,000
Holland and Belgium	9,500,000	Argentina			14,000,000
Italy	9,000,000	The Balkans			7,000,000
Other European countries ...	7,500,000	India			6,000,000
Non-European countries.....	10,000,000	Australia.....			6,000,000
		Sundry other countries			1,000,000
Total	78,000,000	Total			83,000,000

The total yearly consumption in the U.K. is estimated at 34 million quarters; of France, at 43½ million quarters; of Germany, at 27 million quarters; and of Italy, at 30 million quarters. Last year's figures were, on the supposition that invisible reserves were on somewhat similar lines at the end of the season as at the beginning, for the U.K., 33½ million quarters; France, 43½ million quarters; Germany, 26,200,000 quarters; and Italy, 30 million quarters."

Date.	LONDON (Previous Day).	ADELAIDE.	MELBOURNE.	SYDNEY.
	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.
Feb. 7	Firm, but quiet ; Liverpool steadily held, inactive	3/5½ to 3/6	3/6 to 3/6½	3/6 to 3/6½
8	Firmer, improved demand, Feb.-Mar., 4/8½ ; Liverpool firm, held for 3d. advance	3/6	Do.	Do.
10	—	3/5½ to 3/6½	3/6½ to 3/6½	3/6½ to 3/6½
11	Steady, but quiet	3/6 to 3/7	Do.	Do.
12	Steadily held, not active	Do.	3/6½ to 3/6¾	3/6½ to 3/6¾
13	Steady, but quiet	Do.	Do.	Do.
14	Dull	Do.	Do.	Do.
15	Do.	Do.	Do.	Do.
17	Dull, and offered lower	Do.	3/6½ to 3/7	Do.
18	—	Do.	Do.	Do.
19	Steady, but quiet	Do.	Do.	Do.
20	Firm, with fair inquiry	Do.	Do.	Do.
21	Steady, but quiet	3/6½ to 3/7	Do.	Do.
22	Do.	Do.	Do.	Do.
24	Do.	Do.	Do.	Do.
25	—	Do.	Do.	Do.
26	Steady, but quiet	Do.	Do.	3/6½ to 3/7
27	Steadily held, not active	Do.	Do.	3/6½ to 3/7
28	Steady, but quiet	Do.	Do.	Do.
	Do.	Do.	Do.	3/6 to 3/7

STEAMER FREIGHTS.—(March 1st)—Steamers from South Australia to United Kingdom-Continent, full cargo rates, 37s. 6d. per ton (11½d. per bushel) ; to South Africa, 31s. 3d. per ton (10d. per bushel). Parcels, Port Adelaide to London, Liverpool, or Continent, 32s. 6d per ton (10½d. per bushel) ; Port Adelaide to Melbourne, 8s. per ton (2½d. per bushel) ; to Sydney, 10s. 6d. per ton (3½d. per bushel).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent, 32s. 6d. to 35s. per ton according to size and position (10½d. to 11½d. per bushel) ; to South Africa, 28s. 9d. to 30s. per ton (9½d. to 9½d. per bushel).

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Department reports on March 1st:—

BUTTER FACTORY.

The quantity of cream which came in last month was very much in excess of the corresponding period last year, but no doubt, with the warm spell of weather experienced, a reduction in quantity will be noticeable from now on.

The alteration in price during the month was very slight, the present prices being, superfine, 1s. 2½d.; pure creamery, 1s. 1d.

A. W. Sandford & Co., Limited, report on March 1st—

BUTTER.—Until the middle of February fairly cool weather was experienced for the time of the year, followed by extremely heavy rains, with floods in some parts. Since then, however, the temperatures have been much higher, and right up to the end of the month real summery conditions prevailed. Cream and butter have naturally suffered in condition, but demand for high grades is strong. Best factory and creamery butter fresh in prints, sold at from 1s. to 1s. 2½d. per pound; choice separators and dairies, 10½d to 1s.; store and collectors, 8½d. to 9½d.

EGGS.—Substantial inquiry caused a steady increase in prices, the rates at the end of the month representing an improvement of over 3d. per dozen on prices at the end of January. Guaranteed new-laid hen eggs are 1s. 1½d. per dozen; duck, 1s. 2½d.

CHEESE.—An extensive turnover was experienced in this line, and values therefore show a distinct advance; present quotations being 6½d. to 7½d. per pound new make, large to loaf; matured, 9d.

BACON.—Rates have fairly well maintained in spite of importations, and a good month's business has been recorded in sides, middles, and rolls, while hams also have experienced good demand. Best factory-cured sides, 10d. to 11d. per pound; hams, 11½d. to 1s. 1d.

HONEY.—Values are holding well, and inquiry is good, prime clear extracted quitting at from 2½d. to 3d. per pound; beeswax, 1s. 2d.

ALMONDS are finding a ready sale at, brandis, 6d.; mixed soft shells, 5½d.; kernels, 1s. 4d. per pound.

LIVE POULTRY.—While prices are not so high as recorded during January, the bidding keeps unusually active, buyers bidding briskly for all well-conditioned sorts. Good table roosters fetched 2s. 3d. to 3s. 6d. each; plump cockerels, 1s. 9d. to 2s. 6d.; hens, 1s. 6d. to 2s.; ducks, 1s. 6d. to 2s. 4d.; geese, 4s. to 5s.; pigeons, 9d.; turkeys from 10d. to 11d. per pound live weight for fair to good table birds.

POTATOES AND ONIONS.—Supplies of local potatoes cut off with unexpected suddenness during the first days of February, consequently there ensued a spirited demand for early Gambiers. The quantities of the latter coming forward, however, proved to be inadequate, and substantial importations from Victoria became necessary. Better supplies have since come along from Mount Gambier and the Adelaide hills, and the market stands steady at a price £2 per ton in advance of opening quotations. Onions—A much needed export demand has set in for local onions, with the result that prices have appreciably improved. Potatoes—Locals and Gambiers, £6 per ton on trucks Adelaide or Port. Onions—Locals, £5 10s. to £6 10s. per ton on trucks Adelaide or Port.

RAINFALL TABLE.

The following table shows the rainfall for February, 1913, at the undermentioned stations, also the average total rainfall for the first two months in the year, and the total for the first two months of 1913 and 1912 respectively:—

Station.	For Feb., 1913.	A'v'ge. to end Feb.	To end Feb., 1913.	To end Feb., 1912.	Station.	For Feb., 1913.	A'v'ge. to end Feb.	To end Feb., 1913.	To end Feb., 1912.
Adelaide ...	2.56	0.60	2.75	0.54	Hamley Brdgo	1.50	0.49	1.60	0.36
Hawker	0.51	0.54	0.51	0.34	Kapunda ...	2.45	0.61	2.55	0.38
Craddock	0.51	0.68	0.51	0.26	Freeling	2.16	0.47	2.21	0.59
Wilson.....	0.75	0.60	0.75	1.00	Stockwell ...	2.59	0.50	2.74	0.49
Gordon	0.66	0.61	0.69	0.58	Nuriootpa ..	2.67	0.54	2.75	0.39
Quorn	0.93	0.48	1.18	0.58	Angaston ...	4.62	0.48	4.69	0.46
Port Augusta	0.73	0.47	0.87	0.76	Tanunda ...	3.14	0.57	3.22	0.48
Port Germein	0.43	0.36	0.55	0.40	Lyndoch ...	3.40	0.52	3.40	0.55
Port Pirie ..	0.65	0.35	0.79	0.66	Mallala	1.73	0.44	1.85	0.31
Crystal Brook	0.45	0.52	0.54	0.53	Roseworthy..	1.61	0.45	1.74	0.37
Pt. Broughton	0.58	0.45	0.59	0.58	Gawler	2.15	0.63	2.23	0.52
Bute	0.75	0.33	0.94	0.44	Smithfield ..	2.11	0.55	2.14	0.46
Hammond ..	0.53	0.52	1.00	0.60	Two Wells ...	1.66	0.41	1.68	0.34
Bruce	0.44	0.66	0.61	0.68	Virginia.....	1.91	0.45	1.93	0.42
Wilmington ..	0.94	0.50	1.38	0.81	Salisbury ...	2.46	0.54	2.54	0.47
Melrose	1.02	0.83	1.15	0.58	Teatree Gully	2.67	0.78	2.72	0.77
Booleeroo Cntr.	0.55	0.55	0.82	0.44	Magill	2.64	0.58	2.83	0.89
Wirrabara...	0.56	0.59	0.96	0.71	Mitcham ...	2.41	0.42	2.57	0.40
Appila	0.44	0.62	0.62	0.42	Crafers	3.08	0.82	3.37	1.26
Laura	0.52	0.61	0.58	0.33	Clarendon ..	2.45	0.69	2.85	0.74
Caltowie	0.68	0.63	0.88	0.38	Morphett Vale	3.29	0.46	3.45	0.44
Jamestown ...	0.42	0.62	0.49	0.62	Noarlunga ..	1.95	0.46	2.05	0.32
Gladstone ..	0.42	0.65	0.44	0.35	Willunga ...	3.40	0.60	3.58	0.60
Georgetown...	0.44	0.66	0.49	0.71	Aldinga	2.47	0.33	2.64	0.44
Narridy	0.46	0.59	0.51	0.61	Normanville	2.84	0.50	3.00	0.46
Redhill.....	0.38	0.60	0.44	0.87	Yankalilla...	4.37	0.31	4.65	0.49
Koolunga....	0.29	0.71	0.35	0.57	Eudunda	1.34	0.50	1.57	0.71
Carrieton ...	0.22	0.51	0.39	0.47	Sutherlands	0.85	—	1.08	0.63
Eurelia.....	0.43	0.48	0.71	0.88	Truro.....	3.09	0.51	3.37	0.64
Johnsburg ...	0.43	0.42	0.57	0.33	Palmer	3.17	—	3.19	0.22
Orroroo	0.44	0.58	0.79	0.56	Mt. Pleasant.	3.41	0.65	3.44	0.78
Black Rock...	0.34	0.54	0.81	0.46	Blumberg ...	2.05	0.57	2.10	0.70
Petersburg ...	0.69	0.51	0.85	0.80	Gumeracha ...	2.64	0.68	2.71	0.85
Yongala	0.50	0.56	0.65	0.65	Lobethal ...	2.27	0.71	2.45	0.83
Terowie	0.23	0.69	0.32	0.41	Woodside ...	2.50	0.75	2.68	0.99
Yarcowie ...	0.30	0.58	0.34	0.45	Hahndorf ...	3.09	0.62	3.30	0.67
Hallett	0.26	0.57	0.36	0.67	Nairne	2.09	0.76	2.29	1.00
Mount Bryan	0.34	0.93	0.34	0.85	Mt. Barker ...	2.73	0.85	2.94	0.60
Burra	0.70	0.64	0.77	0.53	Echuanga ...	3.06	0.64	3.33	0.53
Snowtown ...	0.36	0.44	0.39	0.26	Macclesfield ..	3.08	0.58	3.32	0.47
Brinkworth ...	0.49	0.70	0.54	0.50	Meadows.....	2.01	0.63	2.26	0.31
Blyth.....	0.60	0.55	0.60	0.60	Strathalbyn..	2.87	0.62	3.15	1.10
Clare.....	1.18	0.77	1.19	0.78	Callington ..	2.04	0.51	2.16	0.48
Mintaro Cntrl.	0.83	0.69	0.83	0.52	Langhorne's B.	0.87	0.46	0.99	0.77
Watervale...	1.36	0.64	1.40	0.83	Milang	1.60	0.52	1.73	0.69
Auburn	1.13	0.78	1.17	0.87	Walleroo ...	0.26	0.37	0.28	0.82
Manoora ...	0.87	0.50	0.90	0.75	Kadina.....	0.38	0.34	0.47	0.70
Hoyleton ...	0.39	0.45	0.51	0.03	Moonta	0.33	0.37	0.37	0.60
Balaklava ..	0.37	0.42	0.57	0.29	Green's Plns..	0.32	0.28	0.44	0.49
Pt. Wakefield	0.37	0.47	0.50	0.84	Maitland ...	0.36	0.43	0.44	0.43
Saddleworth..	1.39	0.68	1.57	0.71	Ardrossan ...	0.38	0.35	0.41	0.36
Marrabel ...	1.08	0.48	1.25	0.63	Pt. Victoria..	0.20	0.32	0.31	0.65
Riverton ...	1.64	0.56	1.93	0.71	Curramulka...	0.26	0.28	0.41	0.31
Tarlee.....	2.20	0.51	2.33	0.74	Minlaton ...	0.17	0.33	0.27	0.59
Stockport ..	1.28	0.42	1.43	0.59	Stansbury....	0.43	0.32	0.50	0.42

RAINFALL TABLE—continued.

Station.	For Feb., 1913.	Average to end Feb.	To end Feb., 1913.	To end Feb., 1912.	Station.	For Feb., 1913.	Average to end Feb.	To end Feb., 1913.	To end Feb., 1912.
Warooka....	0.34	0.36	0.35	0.55	Bordertown...	2.19	0.41	2.27	0.09
Yorketown .	0.21	0.30	0.29	0.75	Wolseley ...	1.11	0.32	1.16	0.05
Edithburgh .	0.41	0.41	0.42	0.50	Frances ...	1.29	0.30	1.71	0.42
Fowler's Bay.	3.90	0.37	3.96	0.39	Naracoorte .	1.36	0.59	1.66	0.52
Streaky Bay.	2.44	0.47	2.44	0.71	Lucindale ..	0.53	0.48	0.74	0.47
Port Elliston.	0.33	0.49	0.41	0.27	Penola.....	0.97	0.73	1.28	1.48
Port Lincoln.	0.51	0.50	0.65	1.01	Millicent ...	0.58	0.77	1.35	1.67
Cowell	0.12	0.46	0.12	0.86	Mt. Gambier.	0.62	0.95	1.10	2.28
Queenscliffe...	0.51	0.37	1.18	0.84	Wellington .	2.03	0.40	2.11	0.27
Port Elliot .	0.92	0.65	1.19	0.79	Murray Brdg.	2.54	0.40	2.59	0.17
Goolwa.....	1.32	0.56	1.63	0.93	Mannum ...	1.72	0.38	1.72	0.10
Menangle ...	1.27	0.52	1.50	0.72	Morgan	0.49	0.40	0.49	0.48
Kingston....	0.57	0.54	0.86	1.03	Overind. Crnr.	0.85	0.58	0.85	0.35
Robe	0.45	0.60	1.01	1.10	Renmark ...	1.21	0.61	1.21	0.79
Beachport...	0.71	0.70	1.14	0.86	Lameroo ...	1.61	—	1.68	0.17
Coonalpyn ..	1.41	0.39	1.58	0.42					



AGRICULTURAL BUREAU.

ANNUAL CONFERENCE OF UPPER NORTHERN BRANCHES.

The Annual Conference of the Upper Northern Branches of the Agricultural Bureau was held in the Institute, at Quorn, on Thursday, February 20th. The Commissioner of Crown Lands and Immigration (Hon. F. W. Young, M.P.) opened the proceedings. Mr. J. G. Moseley, M.P., also attended, and the Department of Agriculture was represented by the following officers:—Mr. W. Lowrie, M.A., B.Sc. (Director of Agriculture), Professor Perkins (Principal Roseworthy Agricultural College), Messrs. D. F. Laurie (Poultry Expert and Lecturer), P. H. Suter (Dairy Expert), the Advisory Board of Agriculture members present being Messrs. Geo. Jeffrey, G. F. Cleland, and Geo. G. Nicholls (Secretary.) The undermentioned delegates attended on behalf of the following Branches:—Davenport, Messrs. J. E. Lecky, A. Bothwell, W. Hodshon; Quorn—J. N. Williams, J. McColl, A. F. Noll, R. Bury, J. Coot, C. Patten, M. Britza, J. Finlay, J. Brewster; Coomooroo—W. Robertson; Cradock—T. F. Hilder, J. M. Gillick; Wilmington—W. Slee, J. Schuppan, S. George, J. Hannagan, G. Schuppan; Wepowie—J. Reilly, C. Pearce; Amyton—T. O'Donoghue, T. Griffin; Orroroo—T. H. P. Tapscott; Arden Vale, Wyacca—J. H. Williss, P. A. Hannemann, M. Eckert, A. E. Hannemann, E. Klingberg; Carrieton—E. W. Radford; Warcowie—J. Feineler. A large number of visitors was present at each session.

WELCOME BY CHAIRMAN.

The chair was occupied by the President of the local Branch (Mr. Robt. Thomson), who, in extending a hearty welcome to the officers and delegates, expressed pleasure at the large attendance. He hoped the Conference would be as successful as others that had been held in the North, and that those who attended would gather information which would be of practical value to them. He then called on the Commissioner of Crown Lands to open the Conference,

OPENING ADDRESS.

In declaring the Conference open, the Commissioner of Crown Lands said that he was present as deputy for the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), who was in Tasmania at the Conference of Ministers of Agriculture. The Government was anxious to show its interest in and sympathy with the Bureau and the farmers generally, and he felt honored in being called upon to address a gathering of Northern farmers, who represented areas of South Australia where great agricultural and pastoral victories had been won by the energy and grit of the settlers. Many of them were situated in localities where the fight against nature was almost overwhelming, and to these men the State owed a great deal. The city offered a tempting call to the people, and that this call had been resisted was a matter for congratulation. It was not his intention to deal with matters appertaining directly to agriculture, but he wished to make one or two remarks concerning the past season. That had acted as a general reminder to farmers that things were not always prosperous. The past history of the State had been one of prosperity and adversity alternating. It was a mistake to pay boom prices for land. The value of land was its producing value, and this point should not be overlooked. While the person who desired, say, to square off his farm, might be justified in paying a high price for the necessary area, this price should not be taken as an indication of the value of the surrounding land. There was a tendency to relax efforts in the direction of careful farming, and the folly of this was demonstrated last season. In some instances large areas were put in indifferently tilled instead of smaller areas carefully tilled. Where the latter policy had been adopted this season the yields had been very satisfactory. It was gratifying to know that, notwithstanding the season, such a splendid average as 9bush. was achieved for the whole State. Twenty years ago, if such a season as the last had been experienced, there would have been a total failure of the crop. That proved that the farming community had learnt a great deal during that period in the direction of putting the theories of science to practical use. The Scottish Commission, which visited here some years ago, said the farming in South Australia was the best they had seen during their travels. Dr. Nobbs, the Director of Agriculture for Southern Rhodesia, said that the good farming in this State was equal to anything he had seen elsewhere. The successful farmer to-day was the man who was using his land intelligently, paying due heed to those things which science had to teach; and there was no better method of making this knowledge available to the farmer than through the agency of the Agricultural Bureau. Experts could visit the meetings and deliver addresses, and the farmers had the opportunity of discussing matters of mutual interest. He sincerely trusted that the result of the Conference would be the dissemination of knowledge and information to the lasting good of the producing interests of the Northern Areas,

HERD TESTING.

The Dairy Expert (Mr. P. H. Suter) delivered an address, in which he dealt at length with the necessity for more care and attention being given by farmers to their milking cows. There was no reason, he said, why the value of the output of dairy produce from South Australia should not be doubled without the keeping of an extra hoof. Education in regard to dairy practices had vastly improved the condition of Denmark, and this should have a similar effect here. The co-operative system had done a great deal in that country, but in Australia it had only been successful where the people could produce large quantities of milk within a limited area, and where loyalty had lived among the farmers. In South Australia, however, with a few exceptions, it had been a miserable failure. This he attributed to (1) the establishment of too many small and weak factories; (2) increased and sometimes unhealthy competition, and the increasing popularity of the hand separator diverting supplies; and (3) the discontent and disloyalty of the farmers and shareholders. Where the conditions warranted it great benefits would accrue from co-operation on the right lines. South Australia had only a limited area which might be classified as suitable for special dairy practice, *i.e.*, the Mount Gambier and Glencoe districts, and the Murray Flats, which had no superior. Still, much could and was being done in the Northern Areas in the production of cream, both good and bad. In recent years there had been a tendency, owing to the rise in land values, towards farming on smaller areas. Consequently it had become necessary to go in for more intense methods to secure a fair measure of success. In South Australia they had about 110,000 dairy cows, and the industry might be set down as being worth £550,000 per annum. The total production during the last two years had shown a decrease, which was due to the unfavorable seasons. Many thousands of cows had fallen into a very weak condition, and had not been milked, while a large number had perished. Especially had that been the case within a radius of 60 miles of Adelaide, where between 500 and 1,000 had died after calving, because they were too weak to rise. He hoped that those poor animals would have suffered for the benefit of the remainder, and that in future the farmers would make adequate provision for such emergencies. Referring to the huge loss sustained through keeping unprofitable cows, Mr. Suter said if they took the average milk yield per cow per annum to be 280 galls., they would have 122 lbs. of butter, which at 8d. a pound would give a return of £4 1s. 6d. per cow in butter, plus the value of the skim milk and the calf, which would make a total of £5. Against that a fair charge covering labor, feed, and interest on capital would be £6 per annum. On those figures there was an annual average loss of £1 per head, which, on 110,000 cows, meant an aggregate of £110,000. As there were a great many profitable cows, however, it had to be assumed that they were carrying the wasters on their backs. By disposing of the unprofitable cows

and replacing them with better animals, thus enabling the yield of butter to be increased to 224lbs. per cow, they would double the present production, and ensure a total cash return of well over a million pounds sterling per annum. In other words they would turn a loss of £110,000 per annum into a profit of nearly half a million. Allowing that half of the cows were showing a profit of £2 a head per annum, the other half were responsible for a loss of £220,000, or approximately £4 a head. In the circumstances was it surprising that dairying was not more generally followed, and that it was hated by many, young and old? Having looked carefully into the dairying conditions in the State, he had come to the conclusion that many people were not making even fair use of the money, time, and labor put into the business. Few appeared properly to realise the amount of care, intelligence, patience, and experience required on the part of the good dairyman. The two main reasons why so many cows were unprofitable were (1) the faulty and haphazard breeding of too great a percentage of cows not adapted for the fulfilment of the purpose for which they were kept, and (2) lack of adequate food conducive to heavy milk yields.

Herd-testing associations had been recommended as a means toward improvement, but while they had proved valuable in countries such as New Zealand and in some parts of Victoria and New South Wales, and might be established on modified lines in South Australia, he considered it would be too costly to appoint officials to travel from farm to farm in this State where the areas, relatively, were so large and the dairies so widely scattered. Personally he favored the farmers co-operating in the purchase of small testing outfits, and doing the testing themselves. By the use of those, which he would at all times be glad to thoroughly explain to them, they could ascertain the wasters in their herds and eradicate them. Generally the farmers seemed to be content to keep "just" cows, not dairy cows; and he doubted if one farmer in every 500 had made it a practice to keep records of the returns given by his various animals. If, however, they would only adopt that course, they soon would be astonished at the results, and find the cows doing all the climbing necessary toward the betterment of their financial position. In conducting testing work it was essential that a thoroughly representative sample should be secured from each cow, morning and night, when in normal condition for two consecutive days in each fortnight during the period of milking. The milk should be carefully weighed and recorded. The sample should be taken immediately after milking by mixing the milk from bucket to bucket, and plunging the bottle or sampler into the centre of the milk. Careful note should be made of the food and the conditions generally in regard to the period of lactation. If the samples were not tested within 12 hours, two drops of formalin should be put into the milk to preserve it. Proportionate samples must be taken. He advised them not to condemn a heifer on her first calf if she were bred upon good milking lines, but to give her a

second trial. A convincing illustration of the need for herd testing was provided by the following summary of returns for a year, from a herd of 10 cows :

Name.	Galls.	Test.	Butter.	Value.		
	Milk.	%	lbs.	£	s.	d.
Buttermaid	1,087	3.6	432	16	4	0
Blossom	825	3.8	346	12	19	6
Yellow Bird	770	3.9	333	12	19	9
Lilac	697	4.2	326	12	4	6
Bloom	563	4.2	263	9	17	3
Princess	458	3.9	198	7	8	6
Nellie	370	4.0	164	6	3	0
Bonnie	400	3.3	145	5	8	9
Jeannie	311	4.0	138	5	3	6.
Buttercup.....	277	3.5	107	4	0	3

That table showed the average return per cow per annum as 575.8galls. of milk, or 245lbs. of butter, worth £9 3s. 10½d. The return from the best cow was 1,087galls., or 432lbs. of butter, worth £16 4s.—more than four times the quantity produced by the worst. The five best cows average 340lbs. of butter, worth £12 15s. a head. The five worst averaged 150lbs. of butter, worth £5 12s. 9½d. a head. Assuming that it cost £6 15s. a head to keep a cow, anything above that represented a profit. The best cow gave a profit of £9 9s., and the worst cow a loss of £2 14s. 9d. The five best cows revealed a profit of £30, whilst on the five worst there was a loss of £5 11s.—a difference of £35 11s., or £7 10s. a head. Cow No. 1 produced 432lbs. of butter at a cost of £6 15s., and it cost just as much to produce the 107lbs. credited to No. 10. If No. 10 had given 181lbs. of butter there would have been only 9d. profit, while No. 1 had exceeded that by 251. Therefore, No. 1 was 251 times more profitable. He hoped they would resolve to work in the direction of demanding better returns from their cows kept, and remember that the energy bestowed upon the robber cow disheartened their wives and children, who soon learnt to hate her. The need for careful handling of cream was also touched on by the lecturer. Between 50 per cent. and 60 per cent. of the cream sent to the factories arrived in a bad condition, and, as a result, the suppliers were losing from £40,000 to £60,000 per annum. A great mistake made by many farmers was to keep the cream too long. It should be forwarded to the factory at least three times a week in the summer, and not less than twice a week in the winter. In all circumstances it should be kept as cool as possible, and different lots of cream should not be mixed together until they were practically at the same temperature. On no account should preservatives be used, and scrupulous cleanliness should be observed. Complaints were heard at different times about the manufacturers “robbing the suppliers”; but the trouble was that the latter often expected a tiptop

price for an inferior article, and were disappointed when they did not get it. There was need for better accommodation at some of the railway stations for the temporary storage of cream, and he hoped that the railway authorities would take prompt action in the matter.

NOXIOUS WEEDS.

This subject was dealt with in a paper by Mr. J. Reilly, of the Wepowie Branch, which has already appeared in the *Journal* on page 600 of the December, 1912, issue. The question was discussed at considerable length by the delegates.

Mr. J. McColl (Quorn) regretted to see such a great number of noxious weeds thriving in the North, especially on the travelling stock routes. The adjoining landholders should see that they were kept clean.

Mr. T. O'Donoghue (Amyton) said district councils should experience no difficulty in securing convictions in the case of neglect to comply with the requirements of the Noxious Weeds Act if they took proper steps. The district of Hammond was very clean, and this was due to the efforts of the council to enforce the destruction of the weeds.

Mr. G. G. Nicholls (Secretary Advisory Board) stated that in June last the Advisory Board went thoroughly into this subject. It was found that under the Act of 1862 there was ample power for the Councils, justices of the peace, or private individuals to bring action with every prospect of success. The difficulty had been that the actions had been brought under the District Councils Act. In this there was a clause which provided that the council's own land must first be cleared. A recommendation was made to the Government that a Bill should be introduced to provide for the more effective administration of the legislation, and suggesting that the control thereof should be placed in the hands of officers other than those resident in the district. However, the Government decided that no action could be taken unless the request came from the local governing bodies themselves. There appeared two available courses of action. The first was to consider whether the Agricultural Bureau had sufficient influence with the local governing bodies to bring them to carry out the provisions of the Act. The alternative was to again approach the Government asking that legislation should be enacted to consolidate the present Acts, without making any stipulation in regard to administration.

The Chairman (Mr. J. Thomson, Quorn) thought the noxious weeds legislation should be under the control of the Government.

Mr. M. Echert (Arden Vale and Wyacca) said his particular district had been quite clear of noxious weeds until lately, but the three-chain road was now becoming very dirty. The council failed to take any action, and he approached the Commissioner of Crown Lands, but nothing had yet been done to destroy the weeds.

The Commissioner of Crown Lands said the fact that the Hammond Council had kept the district clean proved that the legislation was not at fault. The difficulty was in the fact that the councils did not enforce the Act. Local governing bodies had been constituted for many years with large powers of self-government, and it was quite open to them at any time to state that they were not able to carry out these powers. It had been suggested that the police should take over the work, but there was no reason why the police officers should be called upon to do work which the district clerks did not care to undertake. The whole trouble was that there was a large body of landholders who were adverse to going to the expense and trouble of destroying the weeds. Nevertheless, some consolidating Act would probably be of advantage.

Mr. E. N. Williams attributed the absence of noxious weeds in the Hammond district to the light rainfall. At Carrieton they had a quarter-mile track running right through the district, and it would be impossible to destroy the star thistles on portions of this at anything like a reasonable cost.

Mr. T. O'Donoghue (Amyton) moved, and Mr. M. Echert (Arden Vale and Wyacca) seconded the following resolution, which was carried:—"That this Conference requests the Government to take action with a view to the more effective control of noxious weeds, and to simplify the Act in respect to giving notice and laying information."

Afternoon Session.

SCIENTIFIC BREEDING.

This formed the subject of an interesting and instructive address by the Poultry Expert (Mr. D. F. Laurie), who pointed out that scientific breeding was of immense importance to the agriculturist, as it affected not only plants, stock, and poultry, but the principles were applicable even to human beings. It was claimed that, as a class, breeders of poultry were a long way ahead of the breeders of other stock. The reason was that the fowl bred quickly. Several generations could be secured in a few years, whereas with cattle and sheep almost a lifetime had expired before a certain mating could be proved. The whole modern conception of breeding had changed during the last 10 or 12 years. Too much attention had been paid to pedigrees, the value of which, in a great many instances, consisted of the paper on which they were written, and they were most misleading. No one should breed stock unless he knew the exact pedigree, because characters were transmissible from generation to generation. He had frequently been asked in regard to poultry what was the best cross. The general effect of crossing two breeds was to thoroughly mix things up. With horse-breeding there were several particular characteristics which had to be bred for, and the same applied to plants,

cattle, &c. Numerous agriculturists were endeavoring to produce rust-resisting wheats with characters such as high gluten content. These could not be obtained by mere crossing. What was wanted was a definite line to work on. Mendel's law of segregation was the first important discovery in this direction. If two birds were crossed, the progeny did not consist of a blend of the characteristics of the parents in equal proportions. A knowledge of this principle enabled a person to breed with some certainty as to what he was going to do. The character of egg-production had been bred and improved in a certain strain of fowls. The original jungle fowl laid from eight to 20 eggs per year. The modern fowl laid up to 250 eggs per year, and the egg-laying character was inherited. The majority of laying hens possessed the pure character of egg-production. If these were crossed with another breed, or another strain of the same breed, it was almost certain that this valuable character would be lost, because it would segregate. In the case of wheat hybridisation, some plants in the crop would be found to resist rust. The fixing of this character was the problem. The existence of beards on certain wheats constituted a specific character. When a bearded wheat was crossed with a non-bearded variety, approximately 75 per cent. of the progeny would carry the beard. Broodiness was beginning to appear among Leghorns. This was the result of reversion, or a return to an old ancestral character which existed in the original birds from which the White Leghorns were bred. The character had remained dormant for a number of years until two birds in which it had been latent were mated together. With the progeny which followed the full instinct of broodiness was secured. Hundreds of crosses in different classes of stock were known to conform to this plan. There were throughout the world breeding associations which were devoting an immense amount of time to research with the idea of solving the problems of which of the characteristics in plants, birds, animals, &c., could be improved and fixed. In the meantime dairy cows, for instance, could be tested, and the unprofitable beasts discarded. If the breeding from the good animals was conducted on a proper scientific system, the breed could be improved. It must not be forgotten that one sex was as important as the other. The females transmitted their characteristics through their sons, and the males transmitted theirs through the daughters. For some time people thought it was a question of alternating generations, i.e., that one generation would be characterised by extraordinary powers, but they had not the power of transmitting these to the next generation. This was not the case. They transmitted them through the next generation. The essential fact was that unless the characteristics were in the blood they could not be transmitted. It was better to breed from one animal that was known to be good than to breed from those of which nothing was known. In the one case the progeny would have the characteristics of the parents, but in the other the breeder was entirely in the dark, breeding miscellaneous stuff, part of which

might be payable and part not so. In the case of poultry, 50 hens could be tested, and out of these 10 or 15 might be worth keeping for breeders. A Leghorn hen, weighing from 4½lbs. to 5lbs., would produce 220 eggs, each about 2ozs. in weight, in a year. To do this it was absolutely essential that the hen should have a strong constitution, and it had been maintained by biometricians that this could not be kept up. This was not so. Whilst they were breeding they must either be going forward or backward. The biometricians believed that there was a tendency to return to what they called a common mean, but the method of the breeder was not to keep on breeding from stock of a low general average, of say 120 eggs per annum in the case of fowls, but to eliminate the poor performers, and to select from the best of those which had the strong laying characteristic the birds of soundest constitution. Darwin pointed out that inbreeding carried out on scientific lines had no bad effects, and the result of egg-laying tests in South Australia have proved this to be wholly desirable. In close breeding, however, they were just as liable to concentrate an undesirable character as a good one. Nevertheless, they would never have had the class of fowls at present existing in this State had it not been for the scientific breeders.

QUESTIONS.

At the conclusion of the address numerous questions were asked and answered by the lecturer. He was opposed to the feeding of green cut bone, as unless great care were exercised there was a danger of ptomaine poisoning. Peas, oats, and wheat scattered on straw litter spread to a depth of about 6in. would be found to constitute an excellent food for fowls. If the birds were not made to scratch for their food they simply put on fat, and the egg-production fell off. Animal food could be supplied in the shape of cooked rabbit. The best ration for turkey chickens was dry crushed grain. The crop capacity of this bird was very small, and they should be given small feeds at frequent intervals. Green stuff, such as garlic and onions, should be given plentifully. They were generally found to do better when allowed to roost in the open on a fence. Where foxes were troublesome, the roosting fence could be enclosed with wire netting.

HOMESTEAD TREE-PLANTING.

Mr. A. F. Noll, of the Quorn Branch, dealt with this subject in the following paper:—"A great deal has been done in the direction of planting trees in the North. About 20 years ago a number of gardens were planted in and around Quorn and the prospects of success at the time were promising. Various trees, such as sugar gum, were also planted, and these likewise gave indications of good growth. Whilst they were young, and good seasons prevailed, the vineyards and orchards seemed to do well, but at the time of the drought they began to go back, and those that were not irrigated have, in the majority

of cases, died right out. The majority of sugar gums planted have died ; a few are doing well ; but it is quite evident that the climatic conditions are not suitable for these trees. The most suitable tree for the district appears to me to be the pepper. These could be supplemented by hardy flowering shrubs such as olives, carobs, tagasaste, and laburnum. Some flowers and various creepers can also be grown fairly successfully. I would advise intending planters to pause before putting in fruit trees and vines where there is not an assured supply of water, as I believe, from past experience, it will pay better to grow wheat. There is a tendency to blame Northern farmers for not having sufficient enterprise to plant gardens, &c., but, in the majority of cases, if those complaining were to try their hand at fruit-growing or gardening in the district, they would realise that the industries were beset with considerable difficulties."

Mr. W. Slee (Wilmington) mentioned that sugar gums were doing well in districts where the rainfall was lighter than was the case at Quorn. Perhaps the soil was not suitable for this tree.

Mr. E. W. Radford (Carrieton) had sugar gums growing at Carrieton and they were doing exceedingly well.

Mr. J. McColl (Quorn) some years ago planted red gums, and they appeared to be doing better than sugar gums. He had successfully grown fruit trees and vines until they were attacked by grasshoppers and other pests.

Mr. J. Brewster (Quorn) had found that the blue gums forced their roots into the ground better than the sugar gums. If the ground could be trenched to a depth of 2ft. or 3ft. the trees would do well.

Mr. J. N. Williams (Quorn) thought the trouble might be attributed to club root. Sugar gums would not thrive in limestone soil.

Mr. G. F. Cleland (Advisory Board) said that in America they were going in for blasting. They bored a hole with an auger to a depth of about 3ft., and into this placed a quantity of gelignite. This practice might prove profitable if adopted in this district. At Renmark it had been successfully tried. The essential was to loosen the soil, and this seemed to be the best method of doing it.

SHEEP AND WOOL.

Mr. George Jeffrey (Advisory Board) delivered a short address. Where sheep were kept, he said, it was advisable to keep good animals and feed them well. For years he had advocated the big-framed Merino sheep, yielding a robust, strong wool, as against the finer quality wool. The chief reason was that the sheep generally possessed a better constitution. They also cut more wool. The calculation of all wool prices was based on what was known as the " clean basis." If a wool worth 1s. 6d. per pound clean lost about half its weight in cleaning, it would be worth 9d. per pound greasy. It was not possible to get the wool too strong, so long as they paid due regard

to the character. Particular care should be taken to see that the rams showed plenty of character in the fleece. It had been objected that there was a tendency to make too many classes when packing wool for market. In isolated cases they were at fault, perhaps, but this was by no means general. All that was necessary was the exercise of a little common sense. The fleeces should be trimmed before being put up. After they were rolled, practically all the subdivision that was necessary in the case of the man who had, say, 10 bales to 15 bales, was to cut out those that were extra heavy or dirty. The preparation of skins for market was an important item. The price of this bi-product to-day was such that farmers were amply justified in taking proper precautions to dry the skins. A drying-frame was not necessary. The skins should simply be thrown over a rail and treated with some anti-weevil solution if they were to be kept for any length of time.

In reply to questions, Mr. Jeffrey said skins should be hung from neck to tail. Frames had a tendency to stretch the skins. He did not believe machine-shearing interfered with the growth of the wool. Before the machines were perfected, and the handling was unsatisfactory, they took the wool out by the roots, and this caused trouble. For this district he favored the pure-bred Merino. Where they were raising fat lambs for market it might be advisable to cross the breed.

FREE PARLIAMENT.

Six-row Barley.

In reply to questions, Professor Perkins said barley could be grown where wheat was grown. Square Head barley was a variety that had been selected at Roseworthy. It was bearded. Cape barley was a general term that was adopted here for all the six-row barley. These yielded well, and if Federation wheat would grow on a 12-in. rainfall, barley would do well. Beardless and stemless barleys were different varieties.

Evening Session.

ADDRESS BY HON. F. W. YOUNG, M.P.

The Commissioner of Crown Lands expressed his intention of dealing with the subject of lands which were being opened up in the near future, and the conditions that had been adopted to enable these lands to be satisfactorily occupied, both in the interests of the settlers and the general community. The North was a splendid recruiting ground for farmers going out into the newly-opened areas. Men on the land there had had experiences which had taught them thrift and given them a knowledge of those trying conditions which prevailed where any country was to be opened up. The State had

now decided to jointly pioneer the land with the farmers, and not leave the whole of the burden with the settlers. Successful occupation meant so much to the community that the community should be prepared to bear their fair share of the risks.

RAILS, ROADS, AND WATER.

Accordingly, Parliament had approved of the building of a number of railways which would practically result in no settler in the new areas being more than 10 miles from a line. Further, roads necessary for the first settlement would be made in advance, and water would be provided where nature would permit, so that no settler would have to carry water any great distance during the first year or two, until he made provision on his own farm. On Eyre's Peninsula there were no underground supplies as was the case east of the Murray, so Parliament had authorised the erection in the former district of substantial sheds with iron roofs, and the provision of tanks, so that settlers would have some amount of water for the first period of their occupancy. Where the State did not actually erect the shed, they had authority to advance the necessary money to enable the blocker to do so immediately he had the land.

GENEROUS LEASE CONDITIONS.

The most important feature was to help the man the most during the first year he was on the land. The Land Act passed last year provided that for the first four years of the lease the settler would not be asked to pay any rent. During that period the man had to keep the land. When four years had expired he would be asked to pay 2 per cent. of the original value placed on the land, not the value he had created. In six years' time he would be asked to pay 4 per cent. of the original value. The Land Board would fix the values as generously as possible in favor of the settler, because they realised that there was much to be done before the land was capable of providing a return. There was the clearing; and the mallee entailed considerable trouble before it was properly disposed of. Also in the great part of the country the roads were of a sandy nature, and, therefore, in spite of the proximity of the railways, the question of transit would remain a matter of considerable difficulty.

The Government recognised that they were not to look so much to the money they received directly for the land, but more to the profitable occupation by the settlers. They were hopeful that this country would add a great area to the grain producing land of the State, and lead to the settlement of thousands of families, because the total area to be catered for by the railways authorised was something like eight million acres, a fair proportion of which was suitable for growing wheat. It was certainly not a lazy man's, nor yet an inexperienced man's, country, and they were therefore looking to farmers' sons as the best source from which to draw the settlers.

They would require some plant, and the means to establish the essential improvements on the land, but above all would be needed industry, grit, and thrift.

AGRICULTURAL LABOR.

The opening up of the land would absorb away a great many of the best of the agricultural workers. Men who had worked well and saved money were now going to have their opportunity of becoming farmers. Share-farming was more popular to-day than it had been previously, and this was taking a great number of the best of the agricultural workers. The question then arose - How were they going to maintain the agricultural industries, not only in the new districts, but in the old settled districts, with a decreasing supply of suitable labor? This point had not been carefully studied in the past. Farmers in South Australia until recently had not been able to systematically employ labor, as had been the case in other countries, and consequently they depended upon casual labor. When the crops ripened they expected to see the men waiting to harvest them. But the men were not always there. Then, perhaps, the farmer was put to the expense of going to the city for a man, engaging him through the Labor Bureau, or some such source, only to run the risk of not securing a suitable person. It seemed to him that if they were going to progress with their farming industries, they would have to look ahead and see that they had an adequate supply of suitable farm labor, and that the conditions were such that good men would look to farm work as a means of livelihood. The best man for agricultural work was the man who had grown up on the soil, who had absorbed the country life from his childhood; and the time was coming when the farmers would have to so arrange matters as to provide employment throughout the year. This might be difficult, but with the exercise of some intelligence they would find it possible, and the farming would be all the better for it. The farming community should in the future look more and more to having the married man on the farm. He should have a cottage, and be given the use of a little grass land; conditions which would make him happy and contented. By having the man there, in the course of time his family would be available as a supply of labor which had been brought up on the farm. The conditions existing between the farmer and his men would no doubt be more satisfactory than they were at present.

IMMIGRATION.

It was not possible to bring this about in a moment. The Government had been giving the matter every consideration, and by way of a start they were going to ask the farmers to consider a suggestion in connection with immigration. They wished farmers throughout the State to indicate how far it would be necessary in their interests to supplement the agricultural workers by means of immigration during the next few years. It was only

on the Government being fully satisfied that the farming community were really in want of suitable farm labor, or were likely to be in want of it in the near future, that they would be justified in introducing people here; because it would not be satisfactory to any Government to bring out men to this State and to feel that they were only going to get employment for from three to five months of the year. These people, if brought out, should have constant employment. Some few months ago the Department of Immigration communicated with the branches of the Agricultural Bureau with a view to obtain information that would enable them to act, and he was sorry to have to remark that the response was not satisfactory. The proposition which the Government had been considering as one which would help to meet the position was this: It was sometimes stated that the adult agricultural laborer from England was not a very satisfactory person to bring out and place on the land, because the conditions at home were so entirely dissimilar to those here that he had to unlearn a great deal. This did not mean that the immigrant was no good, but that he had not the opportunity of adapting himself. Therefore the Government had turned its attention to to the idea of bringing out people who were better able to adapt themselves.

INTRODUCTION OF BOYS FOR FARM WORK.

There were in England a great number of boys between the ages of 16 and 19 years who were anxious to come out to Australia. Out of the thousands of these boys, surely there could be selected a number of good lads. If they could be brought out under a proper system, so that they would spend the first few years on the farms in the country, they would absorb into themselves the conditions prevailing in this State. The proposal was that these boys should be brought out a few at a time, say 50, provided it was known that there were at least 50 farmers, who would do the right thing by the boys, ready to take them. The lads having been brought out, the proposal was that they should be under the control of the State until they were 21 years of age, and that they should be apprenticed for a term of three years to selected farmers. They were to be paid a fair wage, allowing for their youthfulness and inexperience. The farmers would be asked not only to pay the wage, but to teach them all they could, and make the conditions of the boy's life as homelike as possible. The wages would increase as the boys' experience increased, and before the time of the expiration of the articles of apprenticeship, they should be able to command the full wage, and the farmers would have their services for the last two years of the three, when they would be very useful persons about the farm or garden, as the case might be. Also included in the scheme was this proposal: The wages would not be paid, to the boys; they would be paid to the Government, and allowed to accumulate with interest, a small allowance being made for pocket-money. By this the State wished to accomplish two things: They were desirous

that the boys might have a little money in order that they could become useful settlers. It was assumed that at the end of three years they should have saved on a average about £70 to £100 per boy. They would not necessarily receive this money at the end of the apprenticeship; but they would be experienced agricultural workers, able to earn full wages, and by these wages during the intervening period until they reached the age of 21 years, supplement their savings, because they would have been taught a great lesson in thrift. Then they would have an amount of money which would enable them to at least take up share farming, and, judging by the experiences of many people in this State, the deserving among these boys would receive help from the farmers themselves. There was no valid reason, if there was a demand for this labor and the farmers were willing to go to the trouble of teaching the lads, why a constant, but not necessarily a large, stream of these boys should not be started. As they in turn became settlers, the stream could be maintained by further immigrations. The Imperial aspect of the scheme was a very fine thing. It meant that they brought out from England and made useful citizens of boys the great bulk of whom had no outlook whatever in the Old Country. The idea was not entirely a new one. It had been tried in New Zealand and reported on as being very successful. The British Ambassador to America, Mr. Bryce, General Sir Robert Baden-Powell, and other men of equal standing had spoken favorably with regard to the proposal. In the case of the New Zealand experiment referred to, 50 boys were selected from the cities of London and Liverpool and taken out by Mr. Sedgwick, who had made a study of the subject in England for many years. Experience proved that these town boys, taken at the right age, were, by reason of their town training, very much brighter and more eager for the country life, and that they very quickly adapted themselves to their new conditions. Of the 50 brought out, 37 of them at the end of the year were on the farms on which they were placed in the first instance. They all expressed the utmost satisfaction with their changed conditions, and the employers were equally satisfied with the boys. Seven of the remainder were promising to be very successful, but it had been found necessary to change their farms because apparently they had not happened to be placed with just the right man. The remaining six had turned out no good. It was a striking and significant fact in connection with these six that they were the only boys over 18 years of age. Letters written to the New Zealand authorities by farmers with whom the boys had been placed and letters from the boys to their friends in England, a number of which were read, showed conclusively that both parties were satisfied. The Premier would interest himself in the question during his visit to England, and it remained for the farmers in this State to say what they thought of the matter. Whether they agreed with the proposal or not the fullest expressions of opinion were invited. He intended sending out a large number of pamphlets setting out in as brief

form as possible the outlines of the scheme, and requesting information regarding the supply of farm labor, as to how they would be prepared to treat the boys, particularly in respect of home accommodation.

At the conclusion of the address a number of questions were asked by delegates and visitors. These were replied to by the Hon. Commissioner. The proposal was warmly commended by the speakers.

SEED WHEAT.

The Director of Agriculture (Mr. W. Lowrie, M.A., B.Sc.) delivered an address dealing with seed wheat. This, he said, might be thought a subject of little importance, and so it was, as an item of agricultural practice, as it entailed the expenditure of little time on its own account; but he hoped to be able to advance some arguments that would induce farmers to give the matter a little more time. It was one of those factors which made for increasing the yields of the crops. There was a very keen desire on the part of farmers to get hold of any new wheat, or any wheat better calculated to meet their climatic conditions. It was to be hoped that this would continue; but from one point of view it was possible there had been a little too much chopping and changing in the desire to get hold of the right seed wheats. The farmer saw an advertisement or statement of very inviting yields given by some wheat in a particular district, and made an effort to get hold of it. When it was obtained it was put, perhaps, on the best piece of land on the farm, and the conditions of sowing were the very best. The results, probably, showed to some advantage. It was not always the best plan, in order to find the wheat best suited to local conditions, to go outside the area in which those conditions prevailed. Good results had been obtained by doing this, but better results would accrue if farmers would make up their minds to hold fast by those wheats which had proved reliable during good and bad years. He hoped it would not be taken that he was arguing against a change of seed. What he contended was that a change of seed in areas of 11in. to 14in. rainfall, such as they experienced, was a matter of less importance than the necessity for maintaining a high quality in those varieties that had been found successful. Wheats such as Gluyas had been found to struggle well during adverse seasons in the drier areas of South Australia. This variety had its drawbacks, because it went down if the crop were very heavy, and it sometimes choked the stripper; but it did not often give trouble with rust, and when bad weather and unfavorable conditions were experienced it had a wonderful tenacity. King's Early, and a wheat which was considered good for the high land, viz., Dart's Imperial, were likewise suitable to the conditions of the district. Cumberland and Thew also might be found very satisfactory. If a more suitable variety than these were known, there was no reason why it should not be grown. Having decided which varieties, year in and year out, were the most profitable yielders, the most should be

made of them. It was a fact that seed could be changed from adverse to better conditions, as a rule, with benefit. But if it were changed from good to adverse conditions, it might be some time, say a crop or two, before the wheat became acclimatised. They should take the wheat that was already hardened, and grade this, as seed wheat should be graded. As a general rule in South Australia farmers were altogether too easily satisfied with the quality of their seed. Some years ago he got rather a bad time for speaking a little too openly, probably, when he threw out the suggestion that the f.a.q. arrangement was not one on which the State need congratulate itself. The fact that the f.a.q. standard, for a year like the present, in South Australia was 62lbs., was just one of those points which made farmers satisfied with the quality of seed which they thought fit to sow. However heavy the wheat might be, it should be graded, and graded so that they got the best and heaviest grains. The yields would thus be increased to a very appreciable extent. A set of most valuable scientific tests were carried out in Australia some years ago by Dr. Cobb. The results were in favor of sowing heavy seed to the extent of an 18 per cent. advantage. An increased average yield of 10 per cent. would mean that 2,000,000bush. ~~extra~~ would be secured. Grading machines were expensive, but any person who was putting in from 300 acres to 500 acres could afford to buy a machine and so grade his wheat to a very high degree, taking out as much as 15 per cent. from his f.a.q. sample. Even where smaller areas were being cropped, a few farmers could place together a few pounds each and hold the machine co-operatively. Even if one were to lose his share through leaving the district, the loss would be made up many times over by the advantage of having his wheat well graded. This could be done, and it certainly should be done. The 15 per cent. which would be taken out could be fed to the fowls and other stock. This was by no means "selection" as it was understood in connection with the improvement of wheat. In choosing wheats that were to be graded, and in judging those most suitable to the district, it was possible for a person to be misled by being too keen on earliness, or what was sometimes called drought resistance, forgetting that together with drought resistance, in almost all circumstances, went low yields. The earliest wheat might not always prove the best, even here. Wheat like Bunyip, one of the earliest, was a good variety, with a fair constitution, but it had a tendency to come into flower relatively too long before it ripened, and therefore it was exposed to spring frosts, which did the harm when the wheat was in bloom. Other wheats which bloomed later would probably be more profitable. Where the farmer had a knowledge of the milling qualities, and he found that he had a good milling variety that suited the district, he should take it up. It would not entail much trouble to go through some of the best of the wheat and pick out one of the very best plants. The grain from this should be graded and sown, and the best plants again should be taken. It was not

satisfactory just to pick out the best heads, as there might be only a few heads on a plant. The best should be taken from the best continuously, and this, together with the grading of the seed, would improve the grain. The selection and improvement of wheat by cross fertilisation was another means of improvement ; but this could not be done profitably by the farmer making his living from the land. Several men in Australia had done most valuable work in this direction. At the head of these men was Farrer. He expressed the hope that the use of the grader would become general in South Australia, and as a result the wheat yield would be considerably improved.

THANKS TO OFFICERS AND DELEGATES.

The Conference was closed with votes of thanks to the Commissioner of Crown Lands, the members of the Advisory Board, officers of the department, and visiting delegates.



Taking Wild Bees' Honey.

AGRICULTURAL BUREAU REPORTS.

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Pine Forest	903	18	15	Warcowie	*	—	—
Pinnaroo	909	—	—	Watervale	*	—	—
Port Broughton	†	21	18	Wepowie	*	—	—
Port Elliot	920	15	19	Whyte-Yarcowie...	897	—	—
Port Germein	896	—	—	Wilkawatt	915	22	19
Port Pirie	896	1	5	Willowie	*	14	11
Quorn	†	22	—	Willunga	921	1	5
Redhill	897	18	15	Wilmington	†	19	16
Renmark	910	—	—	Wirrabara	*	—	—
Riverton	*	—	—	Wirrega	*	—	—
Saddleworth	*	21	18	Woodside	*	—	—
Salisbury	*	4	1	Yabmana	*	—	—
Shannon	*	—	—	Yadnarie	906-7	15	19
Sherlock	*	—	—	Yallunda	*	—	—
Spalding	*	—	—	Yongala Vale	*	22	19
Stockport	*	—	—	Yorketown	904	8	12

* No report received during the month of February.

† Formal report only received.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

April 9th, May 14th

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Hookina, February 18.

PRESENT.—Messrs. D. Madigan (chair), P. Murphy, J. Carn, J. Henschke, A. Henschke, L. Woods, P. and T. Kelly, B. Sheridan, S. Stone (Hon. Sec.), and one visitor.

DESTROYING WILD OATS.—Mr. B. Murphy read the following paper on this subject:—"During the last few years the wild oats have become very plentiful and troublesome amongst the wheat crops in this district. They come up with the wheat and grow faster. The seed falls before the wheat is ready to be harvested. The best method to rid the land of these is to fallow to a depth of 4in. before they get a start, and to cross harrow a few weeks later. If any should then come up it is advisable to feed them down and cultivate the land to a depth of 2½in." Mr. Carn considered it a good plan to lightly work the land before fallowing, in order to give the oats a start.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Belalie North, October.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. D. Smart (chair), W. Cummings, A. H. Warner, H. and J. Waldhuter, F. D. Bladon, T. P. Scholz, D. Fox, and six visitors.

FIELD TRIALS.—A member of the Yongala Vale Branch read a paper advocating field trials of implements. These enabled the farmers to judge of the value of ploughs, &c., before purchasing. Members generally agreed that these trials could be held more frequently with advantage.

LUCERNE-GROWING.—After having traced the early history of the lucerne plant, a member of the Yongala Vale Branch said that Turkestan was the best variety for Australian conditions. The seeds germinated quickly, and the plants were more leafy and had a stronger root system than was the case with other varieties. Lucerne should not be planted on land which was constantly wet, nor on soil that did not drain well. A firm seedbed in well worked ground was required. The rate of seeding varied with the soil and climatic conditions. Twenty pounds per acre was not too much where rich flats which could be irrigated were being sown. Four pounds or 5lbs. of seed sown on stubble should provide good picking for sheep where early summer rains were experienced. The harvesting should commence when 10 per cent. of the crop was in bloom, and should be completed by the time 60 per cent. had bloomed. When cattle were grazed on growing

lucerne they fed on the young shoots, and thus destroyed the plants; for this reason they should not be allowed to remain in the crop for any length of time. The roots of the lucerne penetrated the soil to a very considerable depth. Once established, the crop would stand for at least seven years. Members thought August the best time for sowing lucerne in this district, as it then escaped the frosts. Mr. Bladon preferred cutting and hand-feeding rather than allowing stock to run on the crop.

Georgetown, February 1.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. A. Hill (chair), M. J. McAuley, J. Bond, M. Page, A. S. Inglis, E. E. Hewett, A. Smallacombe, T. Fogarty, J. Fogarty, R. J. McDonald, and S. Eyre (Hon. Sec.)

CO-OPERATION AMONG FARMERS.—Mr. McAuley read a paper urging the need for greater co-operation among farmers. Incidentally he mentioned that they should furnish at the Bureau meeting a full and true description of new implements and machinery purchased, after a thorough test as to durability and effectiveness, drawing attention to the failures or disadvantages as well as to the good points.

Gladstone, January 18.

(Average annual rainfall, —in.)

PRESENT.—Messrs. R. E. Lines (chair), J. Eley, R. Coe, J. Fisher, G. Fisher, A. Blessing, S. Masters, T. Mutter, F. Mutter, T. Brown, O. P. Lines, T. Hollitt, T. Sandow, P. Sampson, J. Page, A. Anderson, W. L. Evans, E. H. Davies, and one visitor.

POULTRY.—In a paper on this subject Mr. W. J. O'Grady stated that when breeding poultry the provision of a good house was most important. The roof should be rain-proof, and the floor raised 10in. or 12in. above the ground, as a damp floor meant a damp house. It was a good plan to place broken stones, bricks, &c., to a depth of 6in. and then 3in. or 4in. of stiff clay in the house. This should be well rammed. If the floor were not kept dry and sweet the atmosphere of the house would be impure. For roosts a pole about 3ft. from the floor should be fixed so that it could be taken down when the house was being cleaned. For heavy breeds a low platform covered with straw was preferable. Nest boxes should be placed at one end, but not under the perches. The house should be thoroughly cleaned at least once a week, and occasionally washed with lime with a little carbolic added. The yards should be planted with grass, and two houses should be constructed, so that the fowls might rest in one and run in the other. It was advisable to breed from pure stock. The Leghorns and Minorcas were the best laying hens. For table purposes, Game, Dorkings, Wyandottes, Orpingtons, Plymouth Rocks, and Malays were the best. Eggs for breeding purposes should be carefully selected from the best layers. Meat and greenfeed were essential, but the bulk of the food should be composed of grain. Clean pure water was also necessary. They should be fed three times daily, and when being fattened for market cockerels and pullets should not be penned together. A good fattening food consisted of 3lbs. of maize meal and 1lb. of pollard, or 3lbs. of ground wheat and 1lb. of pollard, mixed with hot water with $\frac{1}{2}$ lb. of fat added during mixing. A handful should be enough for each bird. Grit should be always available. The best age for fattening cockerels was between four and seven months, according to the breed; pullets three to five months. The birds should not be fed for the first 10 hours after they were cooped. Milk was better than water for mixing with the food. By pushing back the feathers, layers of fat could be seen down each side of the breast of a bird in prime condition. The chicks, when first hatched, should not be disturbed for 24 to 30 hours. After this it was advisable to put the hen and chicks on a clean sanded floor, which should be so raised as to be perfectly dry. Oatmeal and pollard mixed with scalded milk to a crumbly state should comprise the first meal, and hard boiled eggs should be added for the second. At the third meal dry bread crumbs should be fed, oatmeal constituting the fourth. About three hours should elapse between each meal. This should be continued for about eight days. The hard-boiled egg should then be discontinued, in place of which wheat could be given. From this time the grain foods should be varied, and cracked corn used once or twice a week. Sour food was very bad for chickens. Feeding a little and often was the essential rule. Fresh bone and green grass in abundance were necessary. Shelter, consisting of a few pieces of board, a couple of stakes with a cross piece, and a few bushes would protect them from rain and heat. The coops should be

moved frequently, and the feed troughs and drinking vessels should be cleaned out daily. Hens of laying strains should lay from 150 to 160 eggs of average size every year. All pullets should be from six to seven months old, with all the organs of the body fully developed, before they started to lay. Leghorns, Andalusians, and Minorcas were the best strains for egg production alone, but quality and size of egg were also necessary. Wyandottes, Orpingtons, Dorkings, Langshans, and Game were the best for marketing. They were of good size at five or six months old. The cockerels grew to a greater size if separated from the pullets. Wyandottes and Orpingtons were good all-round fowls. They matured quickly, and layed on an average 130 eggs per year. An outbuilding should be provided for sick fowls, and where fowls were confined to a house they should be compelled to scratch for their food in order to keep them busy. A dust bath should be available to the birds, and a newly purchased fowl should be isolated for a time.

Port Germéin, January 25.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Carmichael (chair), Head, Hacket, Deer, Holman, Teasdale, Crittenden, Blesing, Hillam, and Stock (Hon. Sec.).

EXPERIMENTAL PLOTS.—Mr. Carmichael supplied the following report of the manurial tests he had carried out:—

Plot.	Manure.	Cost of Manure.	Yield. per Acre.	Sale of Wheat at 3s. 6d. per Bushel.	Total Profit.
		s. d.	Bush. lbs.	£ s. d.	£ s. d.
1	No manure	—	12 39	2 1 4	2 1 4
2	Potash, 14lbs. ; min. super., 56lbs.	4 4	15 15	2 14 3	2 9 11
3	Potash, 26lbs. ; min. super., 56lbs.	6 3	14 42	2 10 6	2 4 3
4	Mineral super, 56lbs.	2 6	13 9½	2 6 1	2 3 7
5	Gypsum, 3cwt.	6 0	11 18	1 19 7	1 13 7
6	Gypsum, 1cwt. ; min. super., 56lbs.	4 6	11 25	2 0 0	1 15 6

Size of plots, each two acres. Wheat, Gluyas Early, sown on June 12th, 1912, harvested December 2nd, 1912. Rainfall from June 1st to date of harvesting, 8.50in. Plot No. 1 received more benefit from a late rainfall than the others. Plots 5 and 6 each contained a chain or two of hollow and firmer land, which was more affected by the dry weather than the more sandy soil. Plot No. 1 consisted of the best land, as more sand had blown over it. Plots 2 and 3 were planted on a very even class of soil.

Port Pirie, February 1.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. J. Greig (chair), W. Munday, H. G. Hawkins, T. Johns, F. Johns, E. B. Welch, A. Bond, W. R. Wright, E. J. Hector, and H. M. Lawrie (Hon. Sec.).

THE 1912 SEASON.—Mr. Greig, in a paper on this subject, said the season just past could be correctly regarded as phenomenal. The rainfall registered at his homestead was 2in. greater than that for 1911, but the precipitations took place at different times. The fall for January was .05in. (in one day); for February, .45in. (in two days); for March, .50in. (in two days); for April, .10in. (in two days); and May, .14in. (in three days). The total rainfall for the first five months of the year was therefore 1.24in., distributed over 10 days. Seeding was delayed, and considerable trouble was occasioned by weeds in the crops. The fall of rain during June was 3.27in., distributed over 13 days; 1.80in. fell during 18 days in July, and 2.01ins. were registered in 13 days in August. With August the prospects were splendid, although the weeds were showing in places. Following several light rains during the first week in September the crops gave indications of a bountiful harvest, but the latter part of the month was characterised by dry north and east winds, which quickly evaporated the light showers that fell. In 10 days in September 1.60in. fell, and in October in eight days 1.21in. were experienced. The wheat crops began to suffer under the influence of the dry winds, and some, especially those farther north,

failed to come into head. During November 3-02in. fell in 10 days, and in December 1-69in. fell in five days. These rains, however, were too late to be of assistance to the grain crops, except where very late varieties of wheat were grown, and they did a great deal of damage to the hay. The experiences of the season strongly emphasized the necessity for thoroughly working fallow land. Mr. Hector thought wheat could be grown with a 7in. rainfall on sandy land, but at least 13in. were required for crops on stiff land. From 3in. to 6in. were needed at the commencement of seeding to soak the subsoil. Mr. Hawkins said the late crops benefited from the late rains, especially where the fallow had been well worked. Sandhills that were likely to drift should not be fallowed. Mr. Johns mentioned the prevalence of smut in the crops, both where pickled and unpickled seed had been sown. Mr. Wright had pickled Eclipse and Gluyas wheats about a month before sowing, and the crops were free from smut.

Redhill, February 18.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. McAvaney (chair), D. and B. Steele, Lines, Hayes, Potts, Treloar, Dick, Pengilley, Kelly, P. H. and F. A. Wheaton (Hon. Sec.), and four visitors.

HANDLING WORKING HORSES.—In a paper on this subject Mr. Potts said working horses should be fed and watered three times daily, at regular intervals, and in addition should receive a feed of long hay at night. Large quantities of grain should not be given to horses that were doing heavy work, as this might result in sore shoulders. The animals should not be tied up at night, and in no case should they be put to hard work after a long spell. Where signs of sore shoulders appeared the collar should be eased with a piece of sharp wood, and the shoulders bathed with wattle bark liquid. The most suitable class of horse for farm work was the medium draught. This was faster, stood more work, and required less feed than the heavier animal. There was less danger of the mares slipping foals, and when bred to a good serviceable horse, they usually threw good saleable progeny. Foals should be taken from the mothers at 6 months, locked in a strong roomy stable, and well fed, unless there was plenty of feed in the paddock, where they would do better. Young horses could be broken at 2½ years, but should not be given much work at first. A very free colt should not be put into a wagon, as there was a danger of its straining itself. When catching a colt, it was best to drive him quietly into a crush pen, and in no case should animals be petted when young. In discussing the subject some of the members thought it better to handle the colts from birth, as they were less trouble in breaking in. Mr. Steele had broken colts at the age of 1½ years, worked them for a few months and then turned them out until 3 years of age. This practice resulted in bigger and better horses.

Whyte-Yarcowie, February 1.

(Average annual rainfall, 13½in.)

PRESENT.—Messrs. G. F. Jenkins (chair), G. R. and J. R. Mudge, G. and H. Mitchell, Wittwer, G. W. and W. Mudge, J. E. Hunt, McGregor, McLeod, J. Walsh, and E. J. Pearce (Acting Hon. Sec.).

WHEATS FOR DISTRICT.—Members generally considered Federation and Yandilla King the varieties of wheat best suited to the district. They had been grown here for a number of years and had proved reliable yielders. Dart's Imperial, Marshall's No. 3, King's Early, and Gluyas were also favored. Viking and Le Huguenot had been tried, but they were abandoned as unsuitable. In most instances during the past season very satisfactory returns had been secured by members, but in some cases the yields had been affected by charlock, sheepweed, &c. In the eastern portion of the district the prolonged spell of dry weather in October seriously handicapped the crops.

FALLOWING.—The Chairman mentioned that the usual practice was to go over the land with the harrows and cultivator, irrespective of soil and weather conditions, after fallowing. It often happened that the weather set in dry in October, when this work was being done. It was better to allow the land to lie uncultivated than to break it up roughly in a dry state, as this assisted the evaporation of moisture by the hot winds.

SHALLOW v. DEEP PLOUGHING.—A number of members, principally with a view to cleaning the land of weeds, tried the effect of ploughing to a depth of 2½in. to 3in. only with the skim plough. In the drier portions of the district and on the lighter soils better crops were harvested from land worked in this way than from deeper ploughed

ground. However, on the western side of the district, where the land was of a firmer nature and the rainfall greater, experiments seemed to indicate that deeper cultivation was advisable. Mr. E. J. Pearce tried the following experiment, with the result as set out below. Three plots, each one and a half acres in area, were carefully marked off on firm land with a clay subsoil. Plot 1 was ploughed to a depth of 6in. Plot 2 was worked with a subsoiling plough to a depth of 10-12in., the top 7-8in. being turned up. Plot 3 was worked with a skim plough to a depth of 3in. In all other respects the plots were treated similarly, all being sown on the same day. The harvest results in bushels per acre were—Plot 1, 16½bush.; plot 2, 14½bush.; plot 3, 11½bush.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Balaklava, February 9.

(Average annual rainfall, 15½in.)

PRESENT.—Messrs. H. P. Burden (chair), G. C. Neville, J. Spillane, P. Anderson, W. J. Gleeson, O. Uppill, R. Goldney, F. W. Wagner, H. M. Tuck, E. Fisher, P. H. Shepherd, and B. R. Banyer (Hon. Sec.).

PEAS FOR FEEDING OFF.—This subject was discussed at length by members. Mr. Butler was doubtful whether the land in the Balaklava district was suitable for this purpose. In the South the pea crop was profitable. A year like the present one was too dry. He had heard of instances in which peas paid considerably better than wheat. They were somewhat expensive to put in, costing about 4s. 6d. per bushel, 2bush. were necessary to the acre. Mr. Gleeson thought the growing of peas might be taken up, if only on a small scale. They were profitable for fattening sheep, and they improved the land. He knew of a case where a farmer had secured better returns from his pea crop than from his wheat. Mr. Spillane had heard of peas being sown in the hay crop with advantage. Mr. Neville had tried peas, but they were not profitable. Mr. Uppill sowed an acre or two and cut them for the pigs. On the whole the results were good. Mr. Butler mentioned that peas were very valuable as gatherers of nitrogen.

Blyth, February 15.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. A. L. McEwin (chair), T. Dunstone, C. H. Zweck, M. Coleman, W. and J. Pratt, A. A. Schulze, J. J. Clarke, W. J. Ninnes, R. Buzacott, C. Lehmann, T. Roberts, J. B. Kirchner, M. and T. Williams, J. and F. C. Williams, H. Neuman, H. A. Montgomery, M. Vogt, E. C. Deland, J. T. Harmer, W. Beinke, jun., H. W. Eime (Acting Hon. Sec.), and four visitors.

FALLOWING.—Mr. C. H. Zweck read the following paper on this subject:—"Fallowing to a depth of from 3in. to 4in. on the plains and from 5in. to 6in. on the hills should be commenced immediately after seeding. If heavy rains fall after harvest it is advisable to plough some of the land immediately, as it will then benefit from rains that fall during seeding, and weeds will get an early start. That ploughed after harvest should be cultivated very early or it will set hard. It should be harrowed first crossways, and then after a good rain in the direction in which it was ploughed. The ground should not be ploughed when very dry as it will not set down properly, and takeall is likely to be troublesome. Land which has been out for a year should not be burnt, as a good deal of manure is thus lost. It should be cultivated as soon as the weeds are up and before the soil becomes dry. Cultivated land retains the moisture better than land that has been ploughed. It should be harrowed crossways after the cultivator. The weeds should be fed off by sheep until seeding time. Sandhills should on no account be harrowed, as they are liable to drift; scrub land should also have little harrowing." In the discussion which followed, members generally thought that burning grass or stubble before fallowing was advisable, as much better results had been secured from land treated in this manner,

Clare, December 20.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. Menzie (chair), C. T. Jarman, F. G. Hicks, F. Pink, J. Dux, S. Tuohy, J. Scales, W. Pattullo, P. R. Pascoe, J. Berridge, E. and G. Victorson, R. Hunter, A. Pycroft, W. J. Maynard, F. J. Knappstein, J. H. Knappstein, R. Stuart, A. Hill, B. Lloyd, F. Pryor, A. Dunstone, R. B. James, C. Pink, and P. H. Knappstein (Hon. Sec.), and three visitors.

VISIT TO GREAT BRITAIN.—An interesting paper, which has been printed in full in the local newspaper, dealing with his trip to Great Britain, was read by Mr. W. Pattullo. He was very impressed with the horse stock he saw in Scotland, and the way in which they were treated and cared for was a revelation. Dealing with the system of selling cattle adopted in Scotland, he said that if Australia would take it up it would be very much to the advantage of both buyer and seller. Every salesman had a sale ring, and in a pen adjoining this ring there was a weighbridge, over which the fat cattle must go before entering the sale ring. Just before the sale a bullock was put on the weighbridge. While they were selling that another was being weighed, and so on till the sale was finished. The advantage was that the seller got the value for his beast, the buyer knew exactly what he was buying, and the animal was always started somewhere near its value. The method of shearing sheep was regarded as somewhat primitive; but as a rule cultivation was thorough, and heavy dressings of manure were general. His impression of farming in Great Britain was that it did not pay.

Friedrichswalde, January 18.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. P. Goodfellow (chair), F. W. Duldig, F. W. Schutz, E. Duldig, J. and F. Heintze, E. Reichelt, T. Pfitzner, L. Johnson, J. B. Coombe (Hon. Sec.), and three visitors.

WHEATS FOR HAY AND GRAIN.—Mr. F. Heintze read a short paper on this subject. He considered Bluey or Dart's Imperial one of the best varieties of wheat for hay, and when left for grain it yielded well. Leak's Rustproof was also a good hay and grain wheat. It grew somewhat higher than other varieties, and stock relished it. Federation was superior to all other wheats for grain production. Yandilla King, under certain conditions, would yield heavier returns than Federation, but it was not so consistent. Samples of Leak's Rustproof hay were tabled by Mr. Heintze. It showed splendid growth both in straw and grain, and stood 4ft. 6in. in height. The advantages of Le Huguenot as a hay wheat were recognised by members, but it returned a poor yield of inferior quality grain. Several members thought it inadvisable to sow any particular area expressly for hay, but the majority favored this practice. Marshall's No. 3 and Jonathan wheats were also varieties suitable for hay and grain.

Friedrichswalde, February 15.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. T. Prior (chair), F. W. Schutz, F. and T. Pfitzner, E. Reichelt, J. and F. Heintze, R. Marlow, P. Goodfellow, G. Grope, L. Johnson, J. B. Coombe (Hon. Sec.), and five visitors.

CARE OF HORSES.—Mr. T. Pfitzner, in a paper on this subject, said horses should not be worked until 2½ years of age, and at first only for a half of each day, unless they were particularly strong or spirited. Careful handling and firmness were essential. When doing hard work they should be kept in a closed stable in winter and provided with a bedding of straw or cocky chaff. They should always have sufficient, but not too much feed. The person responsible for the feeding should soon understand the requirements of each horse and feed accordingly. If feed were left in the mangers, some more chaff with a liberal supply of bran or pollard and oats should entice the animals to clean it up at the next feeding. A sheaf of hay should be given to each beast at night, in addition to the usual chaff feed. In the morning they should be fed at least two hours before commencing work, and should also be thoroughly groomed. The stables should be cleaned out daily, and when the animals came in from work they should be allowed to feed for half an hour before being watered. At least one and a half hours were necessary for the mid-day meal. A piece of rock salt in each manger would help to keep the animals in good health. Tenderfooted horses should be shod immediately. Working without

shoes might result in their being permanently crippled. In the discussion which followed, Mr. J. B. Coombe thought it preferable to allow the horses to go straight to water before eating. Food eaten prior to drinking was not properly digested.

Gawler River, January 24.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. W. Rice (chair), A. J. Davis, E. Winckel, W. Richter, J. H. Dawkins, H. C. Dunn, J. Hillier, C. Dawkins, F. Bray, G. Higgins, F. W. Roediger, W. J. Dawkins, B. F. Hillier (Hon. Sec.), and three visitors.

MIXED FARMING.—Mr. W. J. Dawkins read a paper under this heading, as follows :—

"One cannot help feeling that the man who specialises or concentrates in one particular line of thought or industry is the man who leads the world, either by new discoveries or powerful influence. All the greatest discoveries of the present age are due to men who have specialised in that particular movement, and not to the man who dabbles in all kinds of study and never masters any. For instance, the aim of the medical world of to-day is to create specialists, because the medical man realises that it is in the man who concentrates that the public place their confidence. Because of this we have the eye, the ear, the brain, and the throat specialist, the man who makes a special study of surgery, whilst even the dentist has now to specialise; every man at his own particular bent. Why? Because the public demand this expert knowledge and are prepared to pay for it. Again, the man who makes his mark in the artistic world is the man who spends all his time in cultivating his one special gift and not he who tries to become proficient in several. Even in our workshops we find the same traits, and to-day every man is allotted his own individual task, and has to perform that, and that alone. Even in the manufacture of a plough we get the moulder, the fitter, the bodymaker, the man who sets up the implement, and so on. Of course we do get some ploughs that have been made by one man, but they are always more or less unsatisfactory, and to use the expression of one manufacturer, the man who makes them is a 'Jack-of-all-trades and master of none.' To-day the favorite theory of nearly all agricultural teachers seems to be to instil into the minds of the primary producer the necessity for mixed farming. I am quite aware that I am assailing a much loved fancy, but I say, without hesitation and with a firm conviction, that mixed farming is an arrant failure; it is mixed in more ways than one, and often leads to a complete muddle, both on the farm and in the banking account. We producers must follow the trend of affairs and specialise. As a case in point, let me tell you my experience at a somewhat recent clearing sale, showing clearly the evils of mixed farming. The man who was selling had a splendid start, a good education, a good farm situated in a suitable position, and a handy banking account. He set out determined to be a mixed farmer; he started a seed wheat depot, he purchased some of the finest horses available, his Jersey stud was as good as money could buy, some excellent pigs adorned his styes, and poultry of innumerable breeds and high quality occupied his coops and yards. After some eight or ten years in operation he decided to remove to another State and dispose of his effects. I made up my mind to attend the sale, thinking that it would be enjoyable and instructive. Imagine my disappointment when I found his seed wheat only bringing ordinary market wheat prices, his horses thin and puddy, his cattle dying of dry bible, his fowl yards unclean and his poultry all mixed. Only his pigs looked well, and they were purchased by local butchers. Surely a doleful story of the ending to the ethereal visions of the mixed farmer. I believe in a farmer keeping the best stock possible, but one man cannot specialise in more than one branch. When a young man decides to start farming he must find out what his district, soil, and situation are most suited for, and decide what he is most adapted for. When he has done this, let him start operations with that one object in view, and go at it for all he is worth, spend all his time and energy in mastering all its details; in fact, specialise as much as possible. He need not of necessity carry all his eggs in the one basket, but if one basket has to fall, let it be the smaller one. For instance, if he decides to grow hay let him cultivate his soil for that object, and not study whether he will have enough feed for his sheep if he fallows early. Let him put all his energies to his seeding operations at seed-time, and not be running about attending to the ewes and lambs when he should be driving the drill. Let him get to work early and late when the weather and soil are most suitable for sowing the grain, and not be knocking off early and starting late so that he can milk the cows. Let him be enthusiastic in the garnering of his harvest rather than delaying operations because his mares have foals, and he does not feel disposed to work them; and finally, let him choose the best seed wheat for a hay crop, and not study

the grain returns; for what does that matter? He is after the highest hay yield that it is possible to get. In short, he can have side issues only in so far as these side issues do not interfere to any appreciable extent with his special objective. There is only one way in which one man can run a mixed farm on business lines, and that is when his holding is large enough to warrant having a specialist at the head of each individual department. Even then the query comes, will it pay? If it will not, what is the good? If one has cheap labor in the shape of a large family, the tune is changed, but everyone is not fortunate enough to have this opportunity to get the cows, the lambs, the poultry, or the pigs attended to without any further expense, and even then it is a matter for one's self to settle whether it is a fair deal to the children. I believe that a farmer should keep as good a class of seed, stock, and implements as possible, but he must get the majority at least of these renewed from time to time by purchasing new blood from the specialist. I do not believe in a farmer doing too many of his own repairs. Some suggest that a farmer should be a blacksmith, a carpenter, a saddler, a tinsmith, in fact, he should be a general all-round handy man. This idea is fraught with dangers, for many a man spoils more material, burns more coal, and wastes more time, meaning an expenditure of more money, than would have been paid to have had the job done by a specialist, and even then oft-times it is not well done. A man employing labor will not only lose his own time, but that of his men. They will see he is more interested in the workshop than in the farm, and they lose interest. They may not know how he wants the task done, or sometimes the men finish what they are on and have no one to give them another task. The master should be with the men as much as possible. He may get the satisfaction of thinking he has saved money, but has he? The only repairs a man should do are the small ones; he can have a few handy tools, a vice, a bench, and even a small forge and anvil, but he must beware not to lose too much time in the shop. This is the age of big wages and short hours. To the man who can do it quickly and well must the work go." Mr. C. A. Dawkins thought frequently more time was spent in taking repairs to the blacksmith than would have been occupied in doing the work on the farm. Mr. A. J. Davis said that while he would keep fowls, sheep, &c., on the farm, these would have to take second place to the more important work.

Nantawarra, January 23.

(Average annual rainfall, 15in.)

PRESENT.—Messesrs. R. P. Uppill (chair), E. J. Herbert, W. Smith, T. Dixon, J. Nicholls, and (†) L. Tucker (Hon. Sec.)

SEEDING.—Following on his remarks made at the meeting held on August 22nd (printed on page 361 of the October, 1912, issue), Mr. J. Nicholls stated that the policy of waiting for rain before sowing had been very successful this season, as far as he was concerned. He waited until the end of May and then drilled in a small area of wheat just before the rain. There was no comparison between this and the rest of the crop sown after the rain, the later sowing being better in all respects. He had heard many complaints about bunt, but, although he had made a thorough search, there was none visible in his crop. Mr. R. P. Uppill had started sowing some time before the rain. He found, however, that the crop sown after the rain was 4bush. or 5bush. better than the other. Bunt was prevalent in that portion of the crop sown in very wet weather. Mr. Smith also noticed that there was more bunt in the crop sown in a wet state than in that sown under dry conditions. Some Marshall's No. 3, which had been sown dry, turned out the best of his crop. Heavy manuring with super. had proved very effective, both in regard to the hay and grain yield. Mr. E. J. Herbert's experience had been that early rains were conducive to the highest yields. The returns this season were improved by the favorable spring conditions and rains. His best piece of crop was some which had been sown in a dry state, and there was very little smut in it. On the other hand, some which had been sown after the rain was badly affected with smut. Although his yield this year had been a fair one, he believed in waiting a reasonable time for rain before sowing. Mr. Dixon had not noticed a great difference between that part of his crop which was sown before and that sown after the rain. He had not observed any bunt, but there was a little loose smut in the crop sown just after the rain. Although not in favor of sowing in a dry state, Mr. Nicholls considered that Marshall's No. 3 was superior to any other variety for this purpose on reasonably clean fallow. Mr. Dixon favored Yandilla King on clean fallow and King's Early where the weeds were troublesome. Mr. R. P. Uppill thought Marshall's No. 3 did best on light soil, but on heavy land he favored Yandilla King. He had noticed that Marshall's No. 3 did much better in dry than in wet districts.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Kadina, February 1.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Malcolm (chair), R. Correll, D. N. Martin, J. N. Pedler, E. Wilton, G. A. Weidenbach, R. J. Rose (Hon. Sec.).

HARVEST RESULTS.—Mr. J. Malcolm said the rains which fell in November had considerably improved the average yield in the district. Had it not been for those rains the crops in many places would have been complete failures. Federation had not yielded so well as it had last year, but he still thought it was a wheat to be grown. On land near the beach some had yielded 20bush. to the acre. The average, however, was only 9bush. On Emu Downs a farmer had secured an average of 30bush. from an area of 150 to 160 acres. Silver King wheat had also yielded well. Some of it had gone as high as 24bush. to the acre. His own average return for this variety was 20bush. Last season he introduced into the district a variety called 'John Brown.' This has been propagated by Mr. Fredk. Coleman, of Saddleworth. Sown on new land it had averaged about 24bush. He had also sown Huguenot. This was a good hay variety, some this season growing to a height of from 5ft. to 6ft. A portion reaped averaged about 15bush. The average for his farm was a little over 16bush. He had again seen evidence of the benefit derived from cross drilling, and was convinced that where farmers had the strength and time this practice paid. All his wheat this year was of a good sample, and remarkably free from foreign substances. He had received splendid reports concerning the yielding capacity of Late Gluyas. He had supplied four bags of this wheat, and 126½ bags were reaped from it. He tabled a sample of a wheat called German Wonder, by Mr. C. Schultz, of near Port Broughton, which was being eagerly sought after by farmers in this and other districts. Mr. R. Correll had confined himself to the growing of one or two varieties. During the season just closed he had sown Yandilla King and Late Gluyas Yandilla King, which he had grown previously, had taken the place of Marshall's No. 3 and Silver King. It had a fairly high straw as a rule, but owing to the lateness of the rain did not grow so high as usual last season. Had it not been for the late rains in November a great deal of his crop would have been a total failure. He had never seen finer crops of late wheats than those reaped this season. The season opened up very unfavorably. It was not until June 8th that rain sufficient to start germination fell. However, he went on with his sowing and the first 100 acres of Yandilla King were sown dry. As the rain still kept off he put in part of his land with Late Gluyas while it was dry. After the June rains he went on cultivating and killing weeds. The working of the land in this manner made a great difference to the yield. Wheat put in before the rain averaged about five bags, while that put in after the rain averaged about nine bags per acre. In September the Yandilla King variety looked as if it would not yield more than 6bush. or 8bush. to the acre. The late rains, however, made such a difference that some of it averaged 18bush. The Late Gluyas, sown after the June rains, produced an exceptionally fine sample. The quantity sown was under a bushel to the acre, but in the future he would not sow less than a bushel of this variety. His crop averaged, for the whole of his holding, about 18bush. Mr. Correll tabled an ear of wheat of the Late Gluyas variety which showed good grain on one side, and smut on the other. He also tabled a sample of Bunyip. It was from the Inkerman district, and was said to be a fortnight earlier than Late Gluyas. Mr. G. A. Weidenbach said that during the past season he had sown five varieties of wheat on his farm. Yandilla King averaged 16bush.; Marshall's No. 3, 12bush.; Hybrid, 16bush.; and King's Early, 14bush. per acre. Wheat sown on fallowed land yielded the best. Mr. J. N. Pedler's crop was all put on fallowed land. Late Gluyas, which was cross drilled, averaged 25bush. to the acre; Lutz, a new variety, 19bush.; Federation, 15bush.; and Yandilla King 13bush. Mr. D. N. Martin had only sown two varieties, namely, King's Early and Early Gluyas. The former yielded 15bush. to the acre, and the latter 17bush. From an area of 50 acres of fallow sown with oats he cut 1½ tons of hay.

Minlaton, January 23.

(Average annual rainfall, 17 in.)

PRESENT.—Messrs. C. Parsons (chair), A. Washington, T. Giles, H. H. Evans, R. H. McKenzie, R. Page, and J. McKenzie (Hon. Sec.)

HARVESTER.—The Hon. Secretary contributed a short paper on this subject. The harvester, he said, had been condemned because it had turned out an inferior sample of grain, which was frequently attacked by weevil or went black. These troubles were due to the incompetence or carelessness of the driver, not to the machine itself. Its greatest disadvantage was that it failed to save the cocky chaff. Whilst there was an abundance of feed the loss of this was not felt, but this year the chaff was needed. The greater labor involved with the stripper and winnower was compensated for by the value of the chaff. Straw cut with the binder and chaffed made a poor substitute, nevertheless it was advisable for every farmer who had good stubble to cut and stack some for winter use. The harvester was too heavy for rough or sandy soil—up to 19 horses having been used for one machine in this district. It was short-lived, and an old machine in bad order would very likely involve considerable waste. On large farms, or where two or three neighbors could work conjointly, the stripper and motor winnower constituted the most economical method of dealing with the crop. Mr. Evans favored the use of the stripper and motor winnower. Chaffed barley straw made a good stock feed. Mr. Giles said the value of the cocky chaff was quite equal to the extra labor which the stripper and winnower involved. Mr. Page and Mr. Washington both favored the harvester. Mr. R. McKenzie thought it suitable where clean land had to be dealt with, but for heavy, sandy, and rough land the stripper was better.

ENSILAGE.—Mr. C. Parsons tabled two samples of ensilage, one consisting of field peas. This was an excellent means of preserving food for cows, and the feed would keep for a considerable time if the air were properly excluded.

Minlaton, February 13.

(Average annual rainfall, 17in.)

PRESENT.—Messesrs. J. Martin (chair), H. H. Evens, J. W. Griffith, E. Correll, A. Washington, J. Boundy, J. Williams, F. Giles, J. McKenzie (Hon. Sec.).

MANURING.—The Hon. Secretary stated that on good land, and especially in wet seasons, heavy dressings of super. would be found profitable. Mr. Correll had always secured best results from land to which he had given heavy applications, and this year he intended to put on 1½cwt. to the acre.

Moonta, February 4.

(Average annual rainfall, 15in.)

PRESENT.—Messesrs. R. C. Kitto (chair), A. B. Fergusson, P. Ford, J. Andrewartha, T. Laidlaw (Hon. Sec.), and one visitor.

PREVENTING DRIFT.—Mr. W. J. Brinkworth read a paper on this subject, in which he advocated the practice of sowing fallow land with oats or barley in July for feeding purposes and for preventing drift. A farmer in the west of Spencer's Gulf had secured good results with canary seed, and he recommended it, either for feed or for hay. He had sown barley and oats with 70lbs. of manure per acre, and the crop following this had been very satisfactory. On 10 acres he had drilled in five bags of guano super. as soon as the land was ploughed and harrowed. When he was sowing the seed he intended putting on a further 70lbs. or 80lbs. of super. in order to give the crop a good start.

Pine Forest, January 21.

(Average annual rainfall, 13in.)

PRESENT.—Messesrs. W. Attenborough (chair), S. T. Barr, C. Schultz, A. Hewett, and R. D. Goodridge (Hon. Sec.).

PICKLING WHEAT.—Messesrs. Hewett and Rogers (visitor) referred to the advantages secured from using formalin for pickling wheat; seed thus treated should be sown as soon as possible after being pickled.

EXPERIMENTAL PLOTS.—Mr. C. Schultz supplied the following results of experiments which he had conducted with different quantities of seed and manure. The area of the plots was about 1 acre. *Manure Test.*—Three plots were sown with 46lbs. of unpickled wheat to the acre. That receiving 150lbs. of super. yielded 16tush. 8lbs., 90lbs. of super. 12bush.

27lbs., and 60lbs. super. 9bush. 52lbs. *Rates of Seeding.*—Where 90lbs. of super. per acre had been applied, seeding equal to 30lbs. per acre yielded 12bush. 32 lbs., 45lbs. of seed 14bush. 5lbs., and 60lbs. seed 13bush. 31lbs. per acre. A plot sown with 45lbs. of pickled seed yielded 1bush. 28lbs. per acre less than where the seed had not been pickled, but in all other respects treated similarly. On two other plots receiving 60lbs. of super. per acre, 45lbs. of seed returned 9bush. 52lbs., and 60lbs. of seed 10bush. 13lbs. Mr. S. Barr also had conducted tests, and supplied results as follows:—The area of the plots in each case was $3\frac{1}{2}$ acres, and the sowing at the rate of 1bush. of German Wonder wheat per acre. No. 1, 80lbs. super., 20lbs. sulphate of ammonia, 21bush. 45lbs.; No. 2, 60lbs. super., 20lbs. sulphate of ammonia, 21bush. 6lbs.; No. 3, 80lbs. super., 20lbs. potash, 16bush. 20lbs. No. 4, 60lbs. super., 20lbs. potash, 13bush. 14lbs. Sixty acres which were sown with the same seed previously to these plots averaged 19bush. The extra cost of plot No. 1 over the bulk of the crop was 2s. 6d. per acre. An increased yield of $2\frac{1}{2}$ bush., valued at 8s. 6d., shows a profit of 6s. per acre in favor of ammonia dressing. Wheat variety tests were carried out by Mr. Barr. The crops were dressed with lewt. of super. per acre, and they were sown at the rate of 1bush. to the acre before rain with unpickled seed. The results were as follows:—Nhill, 17bush. 6lbs.; Yandilla King, 16bush. 10lbs.; Baroota Wonder, 16bush. 32lbs.; Carmichael's Eclipse, 16bush. 14lbs.; College Selection, 16bush. 36lbs.; Gluyas Early, 15bush. 15lbs.; German Wonder, 15bush. 49lbs.; Silver King, 15bush. 29lbs.; Marshall's No. 3, 15bush. 11b.; Dart's Imperial, 14bush. 15lbs.; Federation, 14bush. 4lbs.; Gallant, 13bush. 45lbs.; Phillis Marvell, 13bush. 35lbs.; Atlanta, 13bush. 26lbs.; Petatz Surprise, 13bush. 44lbs.; Comeback, 13bush. 32lbs.; average, 15bush.

Yorke town, January 18.

(Average annual rainfall, 17 $\frac{1}{2}$ in.)

PRESENT.—Messrs. W. Corroll (chair), C. Domaschenz, A. Jung, F. Siebert, A. Heitmann, C. Anderson, and J. V. Davey (Hon. Sec.).

POTATOES.—Mr. Davey tabled a sample of Pinkeye potatoes from a plot which had been irrigated and dressed with stable manure, ashes, and superphosphate. Mr. Heitmann had secured best results with the Carmen variety. Members were agreed that it was not advisable to grow potatoes in this district except for the purpose of securing early tubers when they were scarce. Superphosphate alone was not sufficient as a manure, as potatoes required potash and nitrates.

DEVELOPMENT OF SOUTHERN YORKE'S PENINSULA.—Mr. W. Corroll read an interesting paper describing the settlement and development of the southern portion of Yorke's Peninsula during the past 40 years. He dealt at length with the hardships with which the early settlers had to contend, and described the changes that had taken place in the farming methods. The history of the salt industry was traced, and reference was made to the improvement in the means of transport that had lately been effected.

Yorke town, February 8.

(Average annual rainfall, 17 $\frac{1}{2}$ in.)

PRESENT.—Messrs. W. Corroll (chair), H. L. Heitmann, C. Domaschenz, F. Modra, F. Liebert, O. C. Will, C. Anderson, R. Newbold, M. F. Rohrig, and J. V. Davey (Hon. Sec.).

POTATOES AND TURNIPS.—Some fine samples of different varieties of potatoes, grown on sandy soil and not irrigated, were exhibited by Mr. Heitmann. Potato manure had been used principally, and best results had been secured from the Prolific variety. Members agreed that potatoes grown locally were superior in flavor to those procured from elsewhere, the difference being attributed to the nature of the soil and the greater care taken in harvesting. Some fine turnips were also exhibited by Mr. Heitmann.

HARVESTER versus STRIPPER.—The majority of members preferred the harvester to the stripper for dealing with the wheat crops in this district. Mr. Anderson thought the prevalence of weevil in wheat taken off by the harvester was due to the fact that the bags were left standing for some time on the damp ground.

WESTERN DISTRICT.

Coorable, January 18.

PRESENT.—Messrs. C. T. Giles (chair), D. Riddle, V. Kingsley, E. Stretton, C. A. Fox, A. Gregory, C. Hobbs, B. Giles, F. Woodforde, J. Murray, A. Riddle, G. Riddle, A. Jackson, H. Hobbs (Hon. Sec.), and three visitors.

BEST WHEATS FOR DISTRICT.—The Chairman said the best wheat for the district was what was known as Big Bullhead, or Rattling Jack. It reaped well, did not shake out, or go down, and yielded well. Although it was said to be subject to disease he had experienced little trouble with it in this respect. The grain was large, and horses seemed particularly fond of the cocky chaff. Grown on his farm this season alongside of Federation under identical conditions, it had yielded 3bush. per acre more than that variety. It made very satisfactory hay, of good color, and palatable to the stock. It grew fairly tall, and chaffed well. Mr. D. Riddle preferred what was known as Little Bullhead, or Californian White. Federation was a good yielding wheat, but it would go back considerably unless the seed were frequently changed.

FARM TOOLS.—Mr. E. J. Stretton read the following paper:—"I do not wish to convey the impression that farmers just starting on the land with limited capital should purchase a lot of up-to-date tools, but every well-appointed farm should have a repairing outfit especially so in a district like our own, where one has to travel a good distance to a general smith, and then runs the risk of finding him too busy to attend to the work at once. My experience in the bush convinces me that it would pay in the long run to invest in a few handy tools, which would, with a little practice, enable the farmer to do most of his repairing at home, without loss of valuable time in the busy season. Trouble is sometimes caused by a simple breakage, such as in a main $\frac{1}{2}$ in. swing eyebolt, or a badly-bent stripper fork, a bent axle, or perhaps a good leading horse going lame on account of a tender foot. Remember the shoe should fit the horse and not the horse fit the shoe, and this is where the first item comes in, i.e., the forge. There are several types, but I would recommend a portable fan blast forge, because this keeps the fire clean, and any kind of fuel can be used in it. With the forge at least three pairs of assorted tongs, a 60lb. anvil, and a $\frac{1}{2}$ in. jaw leg vice are needed. These form the foundation of the farmer's repairing shop. As all new machinery is supplied with oilcans, spanners, &c., it is not necessary to consider these, but the following tools are indispensable:—Hand hammer, claw hammer, shoe hammer, cold chisel, hardie, square and round punch, assorted files, ratchet brace, jack plane, rule, rip and cabinet saws, 66ft. tape, plumb, spirit level, snipe, pliers, oilstone, trowel, soldering iron, steel square, set of stocks, taps, and dies, $\frac{1}{2}$ in. to 1in., a small high-powered drilling machine, with a set of twist drills from $\frac{1}{8}$ in. up to 1in. diameter. This is without doubt one of the most useful machines any man could have, especially where a lot of cast iron forms the base of construction in machinery, such as in windmills. With ordinary care and attention the items quoted will last a lifetime, and I would advise anyone to have a place for everything and keep everything in its place. Tools should be only used for the purpose for which they are intended. It is not a good practice to use a screw-wrench as a hammer, and so batter it about." Mr. Kingsley thought harness-repairing tools, such as leather punches, copper rivets, sewing awls, and waxed thread, indispensable.

Green Patch, February 17.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. F. Gore (chair), T. Murray, S. Bailey, R. Chapman, E. Chapman, H. Schwerdt, H. Hill, R. Sinclair, W. M. McFarlane, C. J. Whillas (Hon. Sec.), and two visitors.

POISONING RABBITS.—Members generally considered that one ounce of powdered strychnine mixed with about 8lbs. of raspberry jam was the most effective strength for a bait for destroying this pest.

HOMESTEAD MEETING.—The Branch took the opportunity of visiting the vineyard and fruit garden of Mr. McFarlane. This was 10 acres in extent, and had been planted for nine years on land which was previously carrying sugar gum and yaccas. A noteworthy feature was the excellent crop of grapes.

Utera Plains, January 18.

(Average annual rainfall, 14in.)

PRESENT.—Messes. Sinclair (chair), A. Venning, Sale, Stephens, J. and M. Abrook, N. Guidera, F. Braunack, R. Hill, C. Bilney, H. Hornhardt, H. Hill, T. and C. Hornhardt, and A. Ramsey (Hon. Sec.)

SELECTING SEED WHEAT.—In a short paper on this subject Mr. N. Guidera urged the necessity for farmers conducting experiments for the purpose of determining the varieties of wheat best suited to the district. He suggested that each farmer should hand-pick a few of the best heads of the variety he required for seed and sow the grain from these in a small plot. The land on which the seed was sown should be clean. Seed wheats sown from the eastern side of the gulf did not always do as well as might be expected when sown the first year, but they usually became accustomed to the conditions with the next sowing. Yandilla King and Federation provided instances of this on his land. King's Early also was said to have been a comparative failure when first sown. It was necessary to put the seed through the winnow at least twice to clean it thoroughly. The co-operative purchase of a seed grader should result in considerable good to the farmers concerned. Mr. Venning and Mr. Searle had both found Yandilla King unsuitable for the district. Mr. Abrook thought that wherever practicable seed should be secured from a district drier than that in which it was to be sown.

Yadnarie, January 25.

(Average annual rainfall, 14·78in.)

PRESENT.—Messrs. W. L. Brown (chair), C., G. A., and F. W. Dreckow, J. A. and E. C. Kruger, F. W. and A. A. Jericho, C. B. Schubert, A. Spriggs, F. W. Stubing, R. B. Deer, L. H. Marston, G. B. Kobelt, A. A. Edwards, B. B. Crosby, S. H. Pearce, J. J. Deer (Hon. Sec.), and a large number of visitors.

FARMING IN SCRUB LANDS.—Mr. R. Parbes read the following paper:—"In dealing with new or scrub land care should be taken to see that the homestead or farmyard is well placed, to avoid shifting later on. That part of the land which is to be cleared for the first crop should be cut so that the fences put up will not have to be altered after a year or two. The homestead should be somewhere in the centre of the block, otherwise there will be considerable loss of time travelling to and from the paddock. A line should be cut from end to end through the centre of the selection, striking, if possible, through the middle of the place chosen for the homestead. This should be cleared wide enough to serve as a road or race when fenced on both sides with a substantial two-barbed wire fence. It will be the means of communication between the homestead and any paddock on either side, and it will be found very handy for watering stock from the dam or tank, which should be as close to the farmyard as the catchment will allow. For the first year I should not clear more than about 100 or 120 acres. This will be sufficient to grow horse feed, seed wheat, and a little market wheat, provided the season is favorable. When clearing begin from the race close to the home and work towards the outer boundary of the block. After the land is cleared and sown a permanent fence should be erected around it. The posts should be about 3ft. 6in. above and 1ft. 9in. in the ground, and placed not more than 15ft. apart. Every fiftieth post should be a strainer. The fence should have one barbed wire on the top and another 6in. below, leaving a space of 3ft between the second wire and the ground, which may be filled up with 3ft. 6in. wire netting fastened to the second wire and buried at the bottom in a furrow previously ploughed. Another piece of the land of a similar size may be cleared alongside for the following year. The house should be built on the side of a slight rise in order to drain off rain-water quickly. Stone is the best material for building, but generally the settler has not enough time, and in many cases has not the necessary capital to put up a stone house at once. In this case galvanized iron and timber should be used. The stables and sheds should be built on the opposite side of the rise to that on which the house is built. This is to keep all refuse away from the house, &c. The house and sheds should be at least 150yds. to 200yds. apart. The settler can then go on year after year improving his farm without having to trouble about shifting fences and buildings."

SOCIAL.—The meeting took the form of a social, and the attendance of a large number of visitors was very encouraging to all concerned,

Yadnarie, February 15.

(Average annual rainfall, 14·78in.)

PRESENT.—Messrs. W. L. Brown (chair), J. A. Kruger, F. W. and A. A. Jericho, A. Spriggs, R. H. Parbs, R. B. Deor, L. H. Marston, G. B. Kololt, B. B. Croshy, S. H. Pearce, J. J. Deor (Hon. Sec.), and one visitor.

FARMING MALLEE LAND.—Mr. F. W. Jericho read a paper on this subject, in which he said the best method of clearing average sized mallee was to go over it with a log drawn by horses. Where the scrub was above 12ft. to 15ft. in height, bullocks should be used instead of horses. After describing a suitable log, the writer said land treated in this way should be burnt off and cultivated as early as possible. Early sowing gave best results on new land, and not less than 1bush. of seed per acre should be put on. It was more profitable during the first year to secure a good stubble for burning than a heavy crop of grain. Where the stubble was not sufficient to ensure a satisfactory burn, the shoots should be cut, and a fire rake or harrows used before ploughing and drilling. Members generally agreed that the scrub log was the best means of getting the mallee down, except where it was very light and intermixed with broom, when a heavy roller would do better work. Mr. Pearce thought it inadvisable to cut shoots before using the fire rake.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Hoopar, February 15.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. J. R. Beck (chair), J. Boyce, E. G. Cotton, A. Hood, J. W. Murphy, W. N. Pearce, W. J. Pearce, G. G. Pitt, C. B. R. Wright (Hon. Sec.), and four visitors.

REPORT MEETING.—Members took the opportunity of reporting on and discussing the methods of cultivation and the results of the harvest. Mr. Pearce had share-ploughed the greater part of his 270 acres, 50 acres of which were sown with oats. Marshall's, Federation, Dart's Imperial, and Early Bart varieties were sown at the rate of 45lbs., together with 45lbs. of super. per acre. All varieties returned practically the same results, i.e., 9bush. Oats on ploughed land gave better returns than on cultivated land. Mr. Cotton had disc-ploughed 190 acres and cultivated 30 acres. Oats returned 13bush. per acre, and a crop of Le Huguenot wheat which was cut for hay yielded about half a ton per acre. Wheat on ploughed land returned 8bush. to 9bush. per acre; on cultivated land it yielded 4bush. to 5bush. Forty pounds of seed and 45lbs. of super. per acre were applied. He noticed no difference in the yield where 70lbs. of super was used. [Was the yield weighed? An extra bushel or two cannot be detected without.—Ed.] His crops had sustained no injury from frost. Mr. Hood had share-ploughed 140 acres and sown 50lbs. of super. and 50lbs. of seed per acre. The wheat yielded an average of 9bush. and oats returned 20bush. per acre. Mr. J. W. Murphy cultivated 180 acres, on 160 acres of which wheat was sown. Oats only yielded 4bush. per acre. The wheat which returned 4bush. to 5bush., was badly affected by both frost and hot winds. He had applied 45lbs. of super. and 45lbs. of seed. Where 70lbs. of super. had been applied the yield had been increased by 2bush. per acre. Mr. G. Pitt had share and disc ploughed 180 acres of wheat and 40 acres of oats. The wheat averaged 5bush. per acre; but where the land was share-ploughed 9bush. of wheat and 12bush. of oats were returned. He had used 60lbs. of seed of Gluyas and King's Early varieties, and 60lbs. of super. per acre. Frost had reduced the yield considerably. Mr. J. Boyce had cultivated 210 acres and had applied 50lbs. of super. and sown from 50lbs. to 60lbs. of seed per acre. A great deal of damage had been done by hot winds. From a crop on sandy soil, with a subsoil of red sand, he had reaped 6bush. to the acre. Mr. Klose reported a return of 4bush. to 5bush. per acre from red land which had been ploughed. Frost and hot winds had greatly reduced the crop. In a 25-acre crop of Bunyip not a grain of wheat could be discovered,

Mr. Beek had put 270 acres under crop. Forty-five acres of oats had returned an average of 15bush. per acre. Gluyas had returned 11bush. on sandy land, and 8bush. on red land. Federation, on ploughed land, yielded 10bush., and 7bush. on cultivated land. Dart's Imperial had yielded 9bush. and 6bush. respectively under the same conditions. King's Early had returned 6bush., but frost had reduced the crop by 50 per cent. Yandilla King was affected by hot winds, and returned 5bush.; and Marshall's No. 3 had yielded 8bush. An interesting discussion followed, and it was agreed that ploughed land averaged not less than 3bush. more per acre than land gone over with the cultivator.

Monarto South. February 22.

PRESENT.—Messrs. G. Patterson (chair), R. E. Anders, A. P. Braendler, B. J., and H. Frahn, G. Gogol, A. and R. Hartmann, B. Hoff, A. Harper, H. Hein, J. G. H., R., and G. Paech, B. and C. Thiele, E. Tilbrook, J. Daley, H. Zeunert, C. F. Altmann, and two visitors.

HARVESTING MACHINERY.—A newspaper cutting, in which the writer attributed the discoloration of grain to the use of the harvester, was read by Mr. E. Tilbrook. It was mentioned that the difference in a sample of wheat could not be noticed until after it had been stored, and the opinion was expressed that the harvester was not a suitable machine for any district which had a heavy rainfall. Members generally considered, that the writer was prejudiced against modern machinery. If harvester wheat got into such a state as set out in the paper, it was not the fault of the machine, but of the farmer for stripping green wheat. There was no difference between wheat taken off with the stripper and winnowed immediately afterwards and wheat taken off and cleaned in the one operation with the harvester. Several members who had used harvesters for several seasons stated that they had never had trouble in this regard.

Parrakie. February 22.

PRESENT.—Messrs. F. J. Dayman (chair), A. J. Beelitz, C., O., and A. Heinzl, M. Killea, M. J. Cooney, A. F. Dayman, W. Threadgold, R. F. Brinkly, F. W. Randall, S. R. Good, F. W. Gravestocks, J. G. Temby, H. Diener (Acting Sec.), and one visitor.

PLOUGHING.—Mr. M. J. Cooney read the following paper on this subject:—"Ploughing should be commenced as soon as possible after sowing is completed. The earlier it is started the more time there is available for attending to the paddocks later on. Some farmers prefer cutting the shoots before sowing, thus giving their horses a rest; but in the meantime a lot of valuable time is slipping by. It would be more advantageous in every way to see to the ploughing, even if the shoot cutting has to be done with hired labor. If this is done the horses will be resting at the time of year when they most need it. The implement used should be determined by the state of the ground. Wherever possible share-ploughs should be used, so that the stumps will be worked out. The disc implement, however, has its merits, and in a paddock overgrown with bushes is much better than the share-plough. It will do better work if only for the reason that it is always running clean, and thus deals with rubbish that would choke other implements. I would plough all ground to a depth of four or five inches, and never less than five inches in a paddock that is being worked for the first time. The soil is almost as sour on the surface as underneath, and so the best policy is to get down on to it from the beginning. When working back, different soils should be treated differently. Sand should be harrowed down in early August, and then left. If this cannot be done in August, do it after a late summer rain. Working up sand from about the end of August, through September and October, is only allowing the high winds prevalent in these months to start it drifting. The stiffer soils should be worked as often as possible after rain. Particular attention should be paid to clayey flats, especially where there is ironstone rubble. This soil is of a cement-like nature, and has a tendency to run together after rain. The time saved by not working the sandy soil could be utilised in working this. Some farmers are of the opinion that the ironstone rubble land is inferior to the general soil, but my experience shows that, if attended to at the right time, it will return crops equal to other classes of land."

In the discussion which followed, Mr. Beelitz said four inches was deep enough for fallowing. He did not believe in working sand deeply at any time, and preferred keeping

the ashes as near the surface as possible. Mr. Temby found that deep ploughing turned up too much clay. Share-ploughs were best where land was clean, but he preferred to work it down with a disc. The Chairman considered that clay soils required deep ploughing, and thorough working afterwards. They gave better results after a heavy dressing of manure.

Pinnaroo, February 22.

PRESENT.—Messrs. B. L. Harfield (chair), M. Beckwith, A. U. Burman, H. E. Dibben, F. H. and P. J. Edwards, H. G. Fewings, L. M. Ferguson, G. Fuller, H. J. Harfield, H. C. Hill, H. Ledger, C. Lee, J. Letheby, M. McCabe, B. H. Nash, E. H. Parsons, A. I. Reed, C. A. E. Schiller, J. Scales, W. Venning, L. H. Wright, W. Wilson, P. H. Jones (Hon. Sec.), and six visitors.

ANNUAL MEETING.—After the election of officers and adoption of reports had taken place the Chairman called on Mr. G. G. Nicholls (Secretary Advisory Board) to address the meeting.

EXPERIMENTAL WORK ON THE FARM.—Mr. Nicholls said that there was ample scope for practical experimental work on the farm. Some matters which could with advantage be dealt with were—(1) the most profitable quantities of super. to apply, (2) the varieties of wheat which yielded best over a series of years, (3) The depth of cultivation in various classes of soil which would lead to the best results over a series of seasons. Other questions that might be made the subject of inquiry were quantity of seed per acre, harrowing the growing crop, the most effective depth of soil mulch on the fallows, &c.

Quantities of Manure.—Considerable difference of opinion existed, he said, as to the most profitable quantity of super. to apply in various districts. It was a pity to continue to apply 40lbs. to 60lbs. of super. if an increase in the quantity would give a bushel or two extra yield over a number of years. No farmer would claim that he could, with any degree of certainty, see a difference of one or two bushels in the standing crop, and the wheat from a known area had to be carefully weighed before the direct profit or loss from a heavier dressing could be ascertained. In the matter of manuring, however, there were other factors than the immediate increased wheat yield to be considered. In some instances an extra 50lbs. of super. might not come back in grain from the first crop, but the land would be kept in better heart and a much greater growth of feed in the stubbles would result. At the Roseworthy Agricultural College Farm Professor Perkins had laid out 12 2-acre plots some years ago to ascertain the increased value of the feed induced by dressings of super. ranging from $\frac{1}{2}$ wt. to 3cwts. per acre. The plots were fed off with sheep during the years when lying out, and the carrying capacity was worked out to the equivalent of the number of sheep per acre per annum. The value of pasture for a sheep for a year was set down as 15s. for the purposes of the comparison, as follows:—

Mean Value of Grazing for Four Years at 15s. a Sheep.

	£	s.	d.
Pasture after $\frac{1}{2}$ wt. super. per acre	1	19	10
Pasture after 1wt. super. per acre	2	5	2
Pasture after 2cwts. super. per acre	2	6	3
Pasture after 3cwts. super. per acre	2	9	1

Thus the extra feed after a crop sown with 1wt. super. was 5s. 4d., leaving a substantial direct monetary return above the cost of the extra hundredweight super. per acre. In addition, the increased grain yield, where such resulted, was secured without cost. Experiments had been conducted by members of several bureaus with gratifying results. The Pine Forest Branch, near Port Broughton, had this year ample proof that under their conditions heavier applications of super. paid handsomely in direct grain return, apart from extra feed. A table showing the results is given below—

Pine Forest Tests.

1910-1911.			
Seed per Acre. lbs.	Super. per Acre. lbs.	Yield per Acre. bush. lbs.	
50	65	24	13
50	85	29	22
1911-1912			
45	60	9	52
45	90	14	5
45	150	16	3

Varieties of Wheat.—It was, of course, recognised that certain seasons favored early wheats, while in others the later varieties filled the bags best. But apart from that fact some varieties did better than others in various districts, and averaged better over a number of years. The best varieties for regular sowing could only be ascertained by testing them under exactly similar conditions over a number of years, and possibly on different types of soil. The speaker then displayed a chart on which convenient sized plots were marked out showing the method of conducting these tests on the departmental plots.

Depth of Cultivation.—It was well known that under certain conditions of soil and climate, cultivation at a depth greater than the ruling practice over a large part of the State was profitable, and although certain cultural practices had of necessity to be adopted for a while in these new lands, it would be decidedly wise to ascertain by carefully conducted test plots how soon those methods could with advantage be modified. Deep cultivation, where the nature and condition of the soil permitted it, gave an advantage to the wheat plant in the extended range for the roots, in the better conservation of moisture, and also in making available larger supplies of plant foods. There were dangers, however, such as bringing to the surface quantities of limestone, or cold clay, and the ploughing up of greater depths of soil necessitated adequate subsequent workings to secure a good seed bed. It was, therefore, very necessary that experiment on small areas should precede any extensive alteration of the practices whose effects were already known. At Whyte-Yarcowie a test had been conducted last season on three plots, each $1\frac{1}{2}$ acres in area. Plot No. 1 was skim ploughed 3in. deep and yielded 11bush. 30lbs. Plot No. 2 was subsoiled from 10in. to 12in. deep and yielded 14bush. 28lbs. Plot No. 3, ploughed 6in. deep yielded 16bush. 42lbs.

Experiments for the District.—There was little doubt that if some of these matters were carefully tested, a great deal of valuable data could be secured upon which the practice of local farmers could be based or modified with considerable advantage to the landholder and the district as a whole. The question was, who was to conduct the experiments. Doubtless individual farmers were already carrying on some such work, but the results were not in all cases made widely known. There was naturally a tendency to say little concerning an experiment if it proved to be a failure, but it was actually just as important that all should know if a practice was unprofitable as that they should learn of any method which led to increased returns. Further, the experiments must be conducted under the varying conditions of a number of years, and the average results worked out before the true value of any practice could be accurately demonstrated. The independent farmer was not so likely to continue for, say, three or five years, keeping careful records of conditions and results, as he would be if he had undertaken a given test in behalf of some institution or society of farmers.

Work for the Bureau.—He suggested that the Bureau should inaugurate some field experiments among members. A few enthusiastic members might be selected to test the effects of an additional quantity of manure on 2-acre plots. Other tests could be planned to extend over a series of years, and would result in the compilation of useful local data. Mr. R. Barr, of Pine Forest, had stated that his manurial experiments had only involved two days' extra work in the year. It was decided to consider the suggestions at the next meeting, and the Chairman announced that if some of the members undertook experiments on behalf of the Branch, the secretary and himself would be willing to keep the necessary records.

Renmark, December 18.

(Average annual rainfall, 11in.)

PRESENT.—Messrs. W. H. Waters (chair), F. Cole, R. Nuttall, J. S. Huggins, W. E. Muspratt, H. DeWitt, N. McDougall, B. H. Williams, F. Basey, M. B. Geneste, H. D. Howie, C. J. Everard (Hon. Sec.), and one visitor.

PEARS.—Mr. H. D. Howie read the following paper on this subject:—"Pears, unlike apples, are particularly adapted to the climatic conditions prevailing in the Murray Valley. They do not suffer from over irrigation, and, though they like plenty of water and cultivation, they are able to withstand drought and neglect. Although the trees thrive in situations where other fruits fail, they amply repay the grower if he gives them the richest part of his plantation. They endure a certain amount of alkali in the soil, although it is very difficult to start the trees if the alkali is present in excess. The export of pears to England has assumed large dimensions during the past 10 years, and with the

advent of perfect carrying arrangements—such as the *s.s. Somersct* gave evidence of last season—there is no doubt this trade will advance by leaps and bounds. The pear is not, like the apple, the poor man's fruit, but the better dessert varieties are always in demand for the London and Continental dining tables. Some of the varieties favored in London are not well known in South Australia, and I will confine my remarks to a few varieties which exporters and growers have recommended to me. The *Doyenne du Comice* (French) occupies the top place in the London market, but is practically unknown to South Australia, though grown slightly in Victoria. Wickson describes it as 'large, varying, roundish pyriform, or broad, obtuse pyriform; greenish-yellow, becoming fine yellow shaded with crimson, &c.; flesh white, fine, melting, aromatic.' The *Josephine* is a favorite, and one of the best carriers. Mr. Harrison, of this settlement, has grown this pear and reports most favorably of it. Mr. Knappstein, of Clare, recommends it as one of the best for shipping. Wickson does not mention it. *L'Inconnue* is a very good carrier and occupies a good place on the London market. It is a very heavy cropper, and is apt to overbear, the fruit then becoming small. The *Glou Morceau* is the only export pear grown to any extent in Renmark. Personally, we have exported this to London with success, and find no difficulty is disposing of our crop in South Australia. The uncertainty of the river has prevented further shipping. This tree fruits better when on quince stocks, although the few trees we have on pear stocks do very well, growing much larger and fruiting more evenly. I highly recommend this. *Bonne Jersey* is another good export pear which has proved to have done well in South Australia. *Winter Nelis* is extensively planted but with moderate success. Where the district suits it is one of the most profitable, but in many parts it is a failure. It occupies with pears a position somewhat equal to that which the *Cleopatra* holds with apples. On the recommendation of a Mildura grower who had a few trees which did particularly well under irrigation, we have planted an acre of these. Wickson describes the fruit as 'medium, roundish, obovate, narrowed in near the stalk; yellowish-green, dotted with grey russet. In flesh yellowish, white, fine-grained, buttery, very melting, and full of rich, sweet, aromatic juice.' The *Madam Cole* is another pear with which we have experimented. It is highly recommended in Victoria, but it is not known much in South Australia. It is described as a splendid late dessert variety. The *Bourre Bosc* comes with a good name, and the results from this pear under irrigation will be eagerly awaited. Among the varieties generally recommended, but which I have particularly been warned against, are the *Beurre Clairgeau*, *Gansell's Bergamot* (which will not keep), and the *Winter Cole*. Another pear worthy of mention is one particularly recommended by Mr. Knappstein, of Clare, whose fine orchard includes all the above-mentioned varieties, viz., the *Durandeau*. Mr. Knappstein says this is the finest eating pear he grows. He has successfully exported it, but the two previous shipments, in common with most other varieties, failed to carry. He has stored it for two months locally, and thinks it will be profitably exported when arrangements are perfected. The tree is a good cropper with very attractive fruit of a red russet appearance, and when quite ripe is almost as bright as a tomato. The catalogue description is 'One of the finest dessert pears, large, handsome, pyriform, highly colored; skin pale-yellow, thickly covered with cinnamon russet, deeper on sunny side, sprinkled with brown dots; flesh white, very juicy, tender, melting, vinous, with rich sugary flavor. Tree vigorous, bears early, very productive; suitable for export.' *Keiffer's Hybrid* is grown in Renmark. It is a difficult tree to get to fruit well, and many people are working it over and others are grafting *P. Barry* stock on some limbs, to effect cross fertilisation, as *P. Barry* is about the only good pear which blossoms so early as *Keiffer's*. I cannot recommend this pear altogether, although some people still favor it, and one grower told me last year he sold every pear of this variety he had at 5s. in the orchard. Many other varieties might be mentioned, but the subject is too extensive for a single paper, and the study of export pears is one the Government might very well have undertaken on some irrigation orchard. The *Fruit World* is at this time collecting all the evidence they can on the subject. For drying and canning there is only one pear to consider, viz., the *Williams* (*Bartlett* or *Duchess*), and it might be well to quote Wickson on this as regards Californian experience. This authority says of the *Bartlett*, that it is 'The pear of California, judged by its popularity both fresh and canned. When well grown its size is grand, and its delicate color, aroma, and richness unsurpassed.' He quotes a Sacramento grower, who says: 'In the Sacramento Valley proper there is but one variety of pear that will justify extensive cultivation, viz., the *Bartlett*. While nearly all varieties may be grown successfully, and many varieties may be desirable for home purposes, yet for profitable orchards we have to confine ourselves to this one variety, except in high altitudes, or localities where the fruit only matures very late. . . . The *Bartlett* pear having qualities that make it a universal favorite for shipping, canning, and for domestic market, no other variety is wanted while it is obtainable. . . . As a healthy grower

and regular bearer it has no equal.' There has been a growing idea that the Williams occupies the same position in Australia; but I would like to point out the difference, that we have no large fresh fruit market nearer than England, and though Victorian growers have successfully exported Williams—and further intend this season to send two shipments of 10,000 cases each on the *Somerset* principle—I do not look with much hope to ever doing a large export trade of Williams from the Murray Valley. This pear has been very largely planted all over Victoria, South Australia, and West Australia, and canners in South Australia have told me that there are more pears planted than will fill their requirements. The option left the grower is to dry his fruit, and at present there is a certain demand for the dried article at a good figure. However, I do not think this trade is capable of very great expansion, and consequently we have turned our attention more to the safer export varieties. Experts differ in opinion as to the best means of pruning pears. We are inclined to think that after shaping the trees for, say, three years, it is well not to prune them to any extent until they have borne a crop. Some of the varieties, such as Winter Nelis, are such uncouth growers that if the grower endeavors to keep them shaped perfectly all along he probably will be cutting them back year after year. The method recommended by Wickson is to cut the tree at planting, forming the head low, and then leave it until it reaches the bearing age for shaping. 'The tree naturally makes a viny growth of young wood, and the object of leaving it alone is that one limb holds the other more upright until the main limbs become large, or stiff enough to keep the shape, so they may be left, after being thinned out to form three to five limbs, as judgment may direct.' Before planting an orchard the grower should ascertain what varieties flower together and alternate his rows with trees flowering evenly. Bees play a very important part in this matter, and I would certainly recommend the pear grower to keep a few hives. I recently read that an experimenter ascertained that 80 per cent. of the fertilisation of pears was due to bees. "

Tintinara, January 25.

(Average annual rainfall, 19in.)

PRESENT.—Messesrs. J. Donaldson (chair), Bell (2), Scott (2), Stead (2), Bainger (2), Filmer (2), C. M. Ives, D. T. Kennedy, E. B. Northcott, A. Koeppen, Wendt, J. E. Taylor, J. Helling, C. P. Hodge (Acting Sec.).

FARMING IN MALLEE LAND.—MR. R. L. SCOTT read a paper, in which he gave his impressions and experiences since he came to Tintinara in 1910. He had tried planting lucerne with his crop to provide feed, but as the ground had been turned over only once, and then with a good deal of undergrowth with it, the result was not good. He believed in working new land deeply, as this considerably facilitated future cultivation. A sufficient area to provide horse feed should be well cleared by the settler as soon as possible. It might be payable to give the crops a second light application of manure in the early spring, but this could only be determined by experimenting. He was fully convinced that the person who put in a small area well would do better than the one who sowed a larger area carelessly.

SEED WHEAT.—The following paper was read by Mr. R. G. Bainger:—"When the farmer has satisfied himself that a certain variety of wheat is the best for his needs, and he determines to sow it on a larger scale, his next thought should be not to see how much he can drill in, but to what extent he can improve the yield per acre, and also to what standard he can raise it. For instance, one man rushes in 500 acres and gets a 5bush. or 6bush. per acre average return, another sows 250 acres, and puts it in well, with a good healthy grain for his seed wheat, and shows a return of 10bush. or 12bush. per acre, not only saving a lot of extra labor and time, but also expense. In a district like this, where the quantity of seed sown is generally light, it would not pay to put in for seed wheat that would shoot straight up with only one or two heads that were very small, and if the crop were at all affected by frost or the wind it would be almost useless to cut it for hay. Therefore, what is needed is a wheat which will stool well and yield large plump heads, and a stem from 3ft. to 3ft. 6in. in height. The stem must be rather thick to stand up against the winds that this district is subject to, and also in case of summer rains. Nevertheless great care must also be taken not to have the stems too thick, or they may become brittle and snap off with the first strong breeze. Some farmers may say: 'Why go to such trouble about your seed wheat when you can buy it from some high-class seedsman for the first year, and for the forthcoming years grade it.' By this method, it is true that you will get nothing but first-class grains, but follow the plants up when they are out in ear, and you will find that there are plants that have not stooled properly, or may not have very large heads, or may perhaps be affected by some disease. If this method

is followed up year after year the standard of the wheat will go backwards instead of improving each year. The best method of securing seed is the 'stud plot' system. Pick out a piece of land that has been thoroughly sweetened, say 2½ chains by 1 chain, and work it well to kill all foreign plants that may be growing on it. With a basket or bag hung by a strap over the shoulder, go through the field where the best of the crop is growing, and pick between 10lbs. and 12lbs. of heads from the best looking plants that are to be seen. Much care should be taken in the selection of these heads, as they are to be the foundation, and the success of the 'stud plots' largely depends on them. The next step is to winnow the heads. This will have to be done by the hand. After the wheat has been thoroughly separated from the chaff broadcast it over the plot of land that has been cleaned for the first 'stud plot,' with an 80lbs. dressing of manure. When this plot is ready to be stripped, go over it and pick out another dozen pounds of heads. These are to be winnowed and put away in a dry place for the 'stud plot' for the next year, then strip the remainder, which, for instance, may go 3bush. This must be well cleaned, for it is to form part of the seed wheat for the next season. With the stud plot planted again with a better wheat than was sown at first, the farmer must still continue to go over it and select the best heads. If he continues this method for a few years grain from his 'stud plot' should be far superior to that at first planted. When he has too much wheat which has been raised or grown from his first stud plot he can get rid of it as seed wheat, and therefore gain a much higher price than if selling it to the miller. As the years pass a still better wheat is taking its place."

Tintinara, February 23.

(Average annual rainfall, 19½in.)

PRESENT.—MESSRS. R. J. Gully (chair), A. Koeppen, Wendt, Bell (3), Scott (2), J. Helling, D. McKeand, R. K. Henderson, D. T. Kennedy, Filmer, Stead, Bainger (2), C. M. Ives, E. B. Northcott, B. Taylor, and M. F. Hodge (Hon. Sec.).

LUCERNE.—The following paper was read by Mr. M. F. Hodge:—"The different varieties of lucerne which have been tried at Tintinara are Hunter River, Arabian, Turkistan, French Provence, American, and South Australian. The first-named I consider is the best for the district, but it must be pure Hunter River seed. It is the most vigorous and hardy, and will stand more feeding than the others. For a quick grower the Arabian is far superior to any other varieties grown here up to date, but if plots of Hunter River and Arabian were grown alongside one another and cut, at the end of the season a greater weight of greenstuff would be secured from the Hunter River. Arabian lucerne is like some of our early wheats, it grows very quickly but does not stool. Hunter River produces more stems to the plant, which more than compensates for the extra height in the Arabian. I would advise all who intend growing lucerne here to avoid Turkistan, as it is waste of time sowing it alongside the two first-named varieties. It is a very slow grower. From my limited experience of the French Provence variety I should say that this will be a good kind, but until I have watched its growth I would not advise further. My experience of American is also limited, but from opinions I have gathered from neighbors this variety may do well. South Australian is pure Hunter River grown for seed in South Australia. If they could be sure that they were getting this seed I would strongly advise all growers to have nothing else. I have noticed in some of these imported varieties useless weeds, which seem to do better than the lucerne. I refer especially to Turkistan. These weeds are a menace which we will have to guard against. I would strongly advise settlers not to attempt to put down any area of lucerne as a permanent pasture unless the land is thoroughly clean and has been well fallowed. Break the land up with a good ploughing in June and July and thoroughly work it down by the end of October, being sure to keep it free of all weeds. Then when the first autumn rains come and the weeds have sprung, cultivate the land lightly and harrow it down as level as possible, after which work the roller in front of the drill, using as little pressure on the drill as possible. I would also advise working the roller after the drill, the same way as the seed has been drilled in, as lucerne likes a firm seed bed. Up to date the most successful stands of lucerne in this district have been obtained from autumn sowing. To the best of my knowledge these stands have all been obtained with the aid of a nurse crop of either wheat or oats. We have made the nurse crop the main crop, and probably have not obtained nearly as good results from the lucerne as we should have done if we had used, say 10lbs. of seed for our nurse crop instead of 40lbs. In the winter the young plant is getting its roots down and is preparing itself for a bad time if it comes along. For instance, this season the lucerne has had a lot to contend with. Grubs kept it back considerably, but as it was sown in the autumn the

plants were strong enough to resist and come through with less loss than if sown say in August and September, as in its young stage lucerne is a very delicate plant. Another argument against spring sowing is that a lot of the young plants may become smothered by the drifting sand. Some neighbors have remarked to me that where they had takeall they secured the best lucerne crops, but these gentlemen forget that the young lucerne had the protection when it was most required. If the seed is good and fresh it will be found that for grazing 6lbs. to the acre is ample, as all seeds germinate very readily in our sandy soil. For irrigation sow 12lbs. to 15lbs. to the acre and cross drill in even quantities. Where possible apply 1cwt. of bonedust and 1cwt. of mineral super. to each acre. Bonedust will cost 7s. per acre, but its effects will last for many years. The super. will give the young lucerne a quick start. This crop also responds well to a heavy dressing of slack lime, say 1 ton to the acre. Of course, that would not be practicable on a large area, as it is too expensive to put on. Judgment and common sense are required in grazing lucerne. A very good rule is to always turn the stock out when there is a fair amount of feed left in the paddock. If a settler has 100 acres under lucerne it will pay him well after the second year to divide his 100 acres up into 10 paddocks. He will get double the feed. The time will soon come when the after cultivation of lucerne will play a more important part than the cultivation of cereals in this district. The first year I would suggest using a good sharp set of stump-jump harrows, going over the lucerne twice, crossing it the second time. A disc would cut out a number of the young plants. The second year use a strong disc cultivator, and work the land about 2in. deep. Three times the amount of feed will be obtained from the lucerne paddocks by cultivating them frequently, where practicable after every feeding off. I would suggest the first working in June and July. It will be noticed that wherever the land round the lucerne plants has been mulched up by the stock those plants are green and fresh and make good growth. Dress the crop with 1cwt. of super. every second year. Whenever the lucerne plant is looking sick, work it and nourish it."

SHEEP AND WOOL.—Mr. N. Bainger dealt with this subject in the following paper:—"Of all the livestock, to my mind the sheep is the most desirable to have on the farm. It is not absolutely necessary that one should be at hand to attend it morning and evening, as is the case with cows. Considering the little work involved it is the most profitable. Our district is not an ideal wheat-growing country. It therefore requires that the whole income should not come from that direction only. Here it is that the wool will supply what may be missing in the shape of grain. Surely, if Lower North farmers find it to their advantage to combine sheep-raising with grain-growing, we, who cannot grow as much grain, but can raise equally good if not superior wool, should find it profitable. The first point the farmer has to look to is the carrying capacity of the farm. I believe in understocking rather than the reverse. He should then look for the breed of sheep most suitable to the country and climate. In this district, although the Merino does well, I prefer one of the long wool crosses, such as the Lincoln-Merino. They are larger framed and better doers. The lambs mature earlier than the Merino, and crossbred wool of this sort has for several years been highly favored by the wool buyers. When getting the breeding ewes together he should procure the large-framed Merino of the Lower North and mate it with the Lincoln ram, which should be carefully picked, a six-tooth for preference; the ewe being 3 years to 6 years of age. The sire should be well grown, bold, masculine looking, robust, and vigorous. The only disadvantage with this cross is that they are as a rule troublesome with the fences. It will be found, however, that if the sheep are bred on the farm they will be more contented and docile. In any case seven wires should effectively control them. On the scrub country I have found that the dry ewes do better than the wethers. In this district I do not favor early lambing. I would rather the lambs came in July than in May, as rains sometimes keep away, and with them the feed, which makes but slow headway at any time until June or July; but here we have an advantage, as the green feed lasts well into November. The number of rams should be 2 per cent.; 3 per cent. is better, for it is preferable to have too many than too few running with the ewes. It is always as well to enter up the date the rams are put with the ewes and the date they are taken away. The rams should not be left in for more than eight or nine weeks. During the first five weeks most of the ewes should become in lamb, but it is better to leave the ram with them for a while, as a lamb three weeks late is better than no lamb at all. Of course, July lambs will not cut a great deal of wool, but if they are shorn at the end of October it will be found that if they are at all backward they will make another start and will improve. The advantages of sheep to the farmer are many. In the first place he is in the position to grow his own meat, which is a very great saving. They will keep his fallow clean from weeds, and there is no doubt the ground is benefited. I have seen the difference time and again in the following year's crop.

Two years ago one of our paddocks was so thickly covered with Scotch thistles that it was cruelty to force the plough team through them. We set to work with mallee slashers—which, by the way, I should recommend as the best tool for the destruction of the thistles—and cut them off level with the ground. After a month we found half of them coming again. We turned the sheep on straight away and they kept them down so that they did not seed. The result was that they have not since reappeared. I do not think the value of the sheep as a cultivator and improver of the soil can be too highly emphasized. I have noticed that a sandy stubble paddock on which sheep are turned will retain moisture almost as well as fallow, as the top is kept loosened. With regard to the drafting yards, it is best to make them of posts or stakes, standing perpendicularly and close together, as the sheep neither see through nor get hung up in them, as is the case with wire and wire netting, nor can they possibly get through. These posts should be about 3ft. high. The yard should be on the slope, so that no water lies about in the wet weather. It is not advisable to have the yards running east and west, as when working one has the sun full in the face. By running north and south one avoids this. Also if the sheep are being drafted with the sun behind them the shadow will fall directly in front, causing them either to turn back or stop and block those behind. The design of the yards themselves depends upon the number of sheep, and as most farmers have ideas of their own, I shall omit this point. When shearing time comes the farmer should provide a cool, well ventilated, but not draughty shed adjoining his drafting yards. It is also as well to get enough sheep to provide a day's work in under cover in advance so that the shearers can start at the proper time, and are not kept idle, as will otherwise be the case owing to the heavy dews we invariably have at that time of the year. The 'get-up' of the clip is most important. No matter how small it may be, the fleeces should be skirted, and the skirtings, locks, and bellies put into separate bales. The fleeces should be classed into two or even three grades if the farmer has a large number of bales. Of course, where there are only a hundred or so sheep I should skirt the fleeces, and from them take the inferior ones, tear them up and put them into the 'pieces' bale. After the bales have been sewn, if a little extra trouble is taken and the number of the bale, kind of wool, and the brand are stencilled on, instead of being scratched on with a piece of stick, it will look nicer and consequently attract attention when otherwise it would not. Six weeks after shearing the sheep should again be mustered and dipped. The farmer will reap the advantage inasmuch that his sheep will be free from tick, which means better condition, and very considerably in the extra money he will get for the wool."

Waikerie, February 24.

(Average annual rainfall, 9in.)

PRESENT.—Messes. E. J. Burton (chair), G. Jackman, A. Lewis, S. Modistach, C. Promnitz, J. J. Odgers (Hon. Sec.).

FEEDING OFF PEAS.—Mr. Promnitz did not think peas would do well in this district, Mr. Jackman said they could be profitably grown on fallow. They should be drilled in fairly thinly, every third or fourth row of the drill being used. Early sowing was essential.

MANURING FRUIT TREES.—Mr. Lewis had during the past two years manured his fruit trees. He found that stable manure improved the yield. A crop following an application of mineral super. was the best he ever had. The trees in question were apricots. Mr. Modistach favored the use of stable manure, and he mentioned the case of 20 five-year-old oranges, which three years ago made no headway, but when dressed with stable manure, ploughed under, had grown splendidly.

Wilkawatt, February 15.

PRESENT.—Messes. D. F. Bowman (chair), W. J. and D. Bowman, jun., C. and T. Sorrell, son., T. Sorrell, J. W. and F. W. Altus, A. J. McAvaney, W. R. and M. Neville, P. Maher, B. Tylor, P. Gregurke, W. J. Tylor (Hon. Sec.), and four visitors.

STRAWSTACKS.—Mr. J. P. O'Shea read a short paper on this subject. He advised farmers to build strawstacks, at the same time adding salt, which made the straw more palatable to horses and cows. He preferred the straw of Bluey or Federation wheats. Members generally advised the stacking of oaten straw where it was available in sufficient quantities.

SORE SHOULDERS.—At a previous meeting a short paper on this subject was read by Mr. B. Spackman. Where the sores were caused by a lump on the collar, this should be flattened by being hammered with a piece of wood. A clean bran bag should then be placed under the collar. The shoulders of horses that were susceptible to this trouble could with advantage be well washed and then dressed with lard and blacklead.

HARVESTER v. STRIPPER.—In a short paper Mr. H. H. Pritchard said he preferred the harvester for use where the land was not too sandy and the ground was fairly level. With this machine there certainly was a waste of grain from the riddles, but this was very small where it was handled competently. With the stripper there was waste at the heaps, and the danger of damage through heavy rains. Where a person would be put to the expense of employing labor to clean the wheat the harvester would be the best machine. Members preferred the different methods as follows:—One favored depending on the harvester, four on the stripper, five thought it advisable to use both.

SOUTH AND HILLS DISTRICT.

Blackwood, February 10.

(Average annual rainfall, 27½ in.)

PRESENT.—Messrs. G. F. Dall (chair), G. R. Laffer, P. H. and D. Williams, W. Gamble, T. C. A. and A. A. Magarey, J. Turner, H. E. Sibley, A. A. Philips, R. J. Wilson, R. Eglinton C. Scherer, A. J. Penno, J. Nicolle, H. Sullivan, L. Sullivan, W. F. Fennell, C. G. Savage (Hon. Sec.), and one visitor.

THE FRUIT INDUSTRY.—Mr. G. R. Laffer gave an interesting address in which he stated that the country between Belair and Clarendon contained some of the finest fruit growing land in the State and in the world, as such a wide range of fruits could be grown to perfection. In one garden at Belair there were over 30 varieties. The pioneer fruit growing of South Australia had been done in the hills. Men came to cut timber, and had planted small orchards in their spare time. Some of the finest cherry orchards in Norton's Summit were started thus. There was practically no limit to the amount of fruit that could be produced in South Australia, but there was a limit to the demand; consequently we had to look for new markets. The successful orchardist needed ability to contend with climatic and soil conditions to overcome diseases, to understand pruning, and the general management of the orchard. Growers should ascertain the varieties which thrived best in their districts and plant accordingly, and grow only those for which there was a demand. For example: Rome Beauty apples grew to perfection at Mount Lofty, and Cleopatra did equally well in this district. Regulation of crops was a matter that should be seriously studied. Seasons of plenty were always followed by seasons of scarcity, when the tree took its natural rest. Seasons of heavy crops meant low prices, therefore a regular medium crop of better quality paid better than irregular crops. Last year there was an abundance of apples for export, and this year the quantity available was small. This must have a serious effect upon the overseas markets. Supplies must be sent regularly to build up a sound export trade. Thinning regularly placed the trees in a better position to bear regular crops of even grade and quality. For this end he preferred thinning before pruning. Along with this practice should go systematic pruning. At the present time the majority of the pruning done in South Australia was carried out in a haphazard manner. He strongly advised any young men who intended taking up orchard work to attend Mr. Quinn's classes at the School of Mines. Equality of growth existed between the roots and branches of the tree. By pruning, the balance was thrown on to the roots; thus a stronger flow of sap to the top of the tree was secured. Aided by systematic pruning this would produce a good crop. If excessive pruning were done an excessive growth of wood and a small crop of sappy fruit would result, and this would be more liable to "bitter pit." The practice of thinning pears had proved very beneficial in producing more regular and uniform crops. The control of codlin moth was more easy where the crop was thinned, for there was not the lodgment or cover on a single fruit that there was in a bunch. There was always a good demand for the best fruit in years of plenty. Over production was brought about by want of proper distribution,

The solution lay in co-operation. Not one out of 50 growers exported his own fruit. They sold to middlemen who had to make a good profit to carry on business. The growers should co-operate and exploit the markets and thus gain a larger trade, which would ensure better treatment. At the present time the multiplicity of brands on export fruit was against the best interests of the trade; also the ideas of grading differed with different growers. Combining and having one shed in which were employed expert packers would result in the export of a large quantity of even grades under one brand. Better results would follow as uniformity created confidence. At the present time there were too many getting a picking out of the export trade. He had been exporting fruit for the last 25 years, and had shipped through many firms, but had always got the best results through the Government Produce Depot. The opening of the Panama Canal would be followed by the export of fruit to the eastern States of U.S.A. There were there enormous trade possibilities for South Australia. The fact of fruit being plentiful made it a commonplace product, and less value was placed upon it; but it could be made more profitable when the excess was exported. The capabilities of the fruit industry were enormous. Many of the export failures were due to the fruit being left on the trees too long. This was the case especially in the export of pears of the softer varieties such as *Beurre Clairgeau* and *Duchess*. *Beurre Clairgeau* pears were picked on the first and last days of March last year and placed in store under similar conditions. These pears all ripened about the same date. The conclusions drawn were that the early picked pears, if exported, would have been a month on their journey before the later picked fruits were taken from the trees, and thus would have arrived at their destination in good condition, whereas the others would arrive in an overripe condition. When prices for fresh fruit were low, drying should be adopted, as payable prices could generally be obtained for this. In reply to a question as to when trees should return a payable crop, Mr. Laffer stated that with systematic pruning apple and pear trees should be in profitable bearing at five years, and peaches earlier. Pruning for the first three years should be with the idea of forming the foundation of the tree. The after pruning should then become more of a thinning process. Root pruning was not advantageous in this climate, except to equalise excessive top pruning. In a fruit-growing district a person with a fair block of from 8 acres to 10 acres of fruit trees could secure a livelihood. Payable returns could be got by growing strawberries and tomatoes until the trees reached a fruit-bearing age.

Hartley, February 19.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wundersitz (chair), F. Burns, B. Klaebisch, W. Bermingham, H. Cross, M. Hassam, W. Cross, S. Pratt, F. Lehmann, W. Brook, A. Wundersitz, T. Phillips, G. Phillips, J. F. Tydeman, G. Hill, J. M. Hudd, J. Stanton (Hon. Sec.), and one visitor.

REGISTRATION OF STALLIONS.—The Hon. Secretary read a short paper on this subject. The examination of stallions for the purpose of determining whether they were sound or not was quite reasonable, but more attention should be paid to the mares. The compulsory registration of stallions did not appear to him to be workable, and the only result he foresaw was the discouragement of breeding.

Kanmantoo, January 18.

(Average annual rainfall, 17in.)

PRESENT.—A. W. Hay (chair), W. Downing, W. Shepherd, H. Shepherd, R. Critchley, R. Downing, E. Shepherd, H. Pym, S. Downing, J. Mills, A. Mills, W. C. Mills (Hon. Sec.), and three visitors.

LESSONS FROM THE DROUGHT.—The Hon. Secretary, in a paper, stated that the periodical occurrence of dry seasons in Australia pointed to the necessity for regulating the number of stock kept. It was a mistake to overstock; but he did not think that the majority of landholders in this district were carrying as many head as their holdings were capable of feeding. Peas would grow well in this district, and this was a far better crop than natural grass. Wherever possible, he thought it was advisable to provide wells in lieu of dams for watering stock, as it was particularly noticeable that a number of the latter dried up during the last dry spell. Advantage should be taken of the scarcity of feed and water to destroy rabbits and foxes. It was a noteworthy feature also that those animals on the farm with a weaker constitution gave out first under dry conditions.

Well-worked fallow would provide a better crop with less rainfall than ground that was not thoroughly cultivated; and the drought occurring at intervals impressed these facts on the cultivators of the soil. Mr. A. W. Hay also read a paper on this subject. He blamed the farmers entirely that so much suffering was caused amongst stock during the last season. If they had taken the care to conserve fodder, a lot of this would have been obviated. In this district it was not an uncommon occurrence for the rain to hold off for a few weeks in April and May, just when the lambs were coming, and a little fodder held against this was almost invaluable. His experience pointed to the fact that it was quite possible to rear a fair percentage of lambs by handfeeding, which was borne out by the following result. He took a lot of 200 ewes which were leaving their lambs, put them in a well-watered paddock, and fed them on chaff and molasses. Five bags of chaff were used daily. The percentage of lambs reared was 60, and he believed that if the feeding had been commenced a week sooner the percentage would have been at least 80.

Kingscote, February 3.

(Average annual rainfall, 18½ in.)

PRESENT.—Messrs. J. Turner (chair), P. T. Bell, J. Wright, A. Neave, J. Codling, P. J. Cook, F. Wood, P. Bromfield, and W. H. Cook (Hon. Sec.).

EXHIBITS.—Samples of yacca gum treated by a process lately patented were tabled by Mr. Bromfield. Ten tons of gum similarly treated had been forwarded to England through the Government Produce Department as a trial shipment. Johnston grass, self-sown, and unirrigated, was exhibited by Mr. Wright. The plants had reached a height of 5ft.

Lyndoch, February 20.

(Average annual rainfall, 23 in.)

PRESENT.—Messrs. A. Springbett (chair), H. Springbett, H. Kennedy, H. Schrader, H. Klauber, E. P. Hausler, P. Burge, F. W. Haese, G. W. Warren, E. Springbett, and J. S. Hammat (Hon. Sec.).

VALUE OF PEAS FOR FATTENING SHEEP.—Mr. Warren read a paper on this subject, in which he said—"There is no more useful feed on a farm than peas. Crushed, or even whole, they make a splendid ration for horses if fed with chaffed hay, especially for a change. The straw is invaluable. Milch cows do wonderfully well on it. I put in 41 acres of peas last season in three paddocks. On one containing 20 acres I drilled 1 cwt. of bonedust, 1 cwt. of super., and 2 bush. of peas to the acre. This paddock is on the face of a hill. The second paddock contained 4 acres of flat, some of my best ground, and I drilled in 2 bush. of peas and 1 cwt. of bones. These two paddocks apparently produced about equal crops. The small paddock was harvested, and eight bags of peas to the acre were winnowed. I turned about 400 lambs on to the larger paddock for six weeks, and as they seemed to make so little impression on the crop in the first fortnight, I turned in about 40 or 50 mixed sheep also. About 200 of the best of these lambs would have brought about 9s. in the Adelaide market straight off the grass, and the other 200 were worth considerably less. Three hundred were sold in the Adelaide market and averaged 12s. 3d., and 140 brought 12s. 8d. I consider that the peas increased the value of these 300 quite 4s. per head, equal to £60 on the 300 head. Roughly, each lamb requires 2½ lbs. to 3 lbs. of peas per day. Had this crop been harvested, allowing 10 per cent. for labor, the peas would probably have returned about £70. I have still 100 lambs, 50 of which are quite as good as those marketed. The lambs were turned in under unfavorable circumstances. After shearing they seemed to go back considerably, and the ewes fattened quickly, apparently neglecting their progeny. The very late rains in November, though beneficial to the peas, forced me to delay turning the lambs in for quite a fortnight, which no doubt caused a further check, as the feed had gone off. After they had been on the peas a week an improvement was noticeable. I am, however, inclined to think that I put rather too many lambs on the peas. If I had been content with, say, 350 head instead of 450, and had been able to hold a fortnight later, I probably would have secured an extra 1s. 6d. to 2s. per head. The third paddock of about 17 acres was put in too late even for this season. The crop was raked and a portion thrashed for seed, but it is still capable of carrying a few lambs. I consider peas a catch crop, which allows of a crop being grown every season instead of the land having to be left as bare fallow. There is no doubt that they enrich the soil to a very great extent. This was proved by a strip of land which produced quite 1 ton of hay per acre more than fallow ground on each side of

it, the plots being worked and manured similarly. There is a great diversity of opinion as to the best time to sow. Some farmers in this district favor August or even September, but I prefer early June. The heaviest and best crops grown in the Blumberg district are planted in that month. Good results are obtained, however, when planted later in the year. It is a very difficult crop to grow, as one hot wind at a certain stage will ruin it, and a bigger risk is taken than in growing any other cereal, but every farmer should give it a fair trial in place of bare fallow."

MANURING FRUIT TREES AND VINES.—Mr. H. Springbett read a short paper. As some of his vines on the slopes of the hills were looking weak and sickly, he drilled into the land a mixture of $\frac{1}{2}$ cwt. nitrate of soda, $\frac{1}{2}$ cwt. sulphate of potash, and 1 cwt. of super. at the rate of 2 cwt. to the acre. The manure was run from a drill fastened between the handles of the plough cutting a furrow 7 in. or 8 in. deep. The following crop showed no improvement, but the growth of wood on the vines was much better and stronger. With the idea of testing the value of green manuring, during the second week in June, 1909, he drilled in 2 bush. peas, 1 cwt. gypsum, and 1 cwt. super. to the acre. On small patches of ironstone gravel and slatestone ground the peas made good headway to a height of about 18 in., but on the sandy soil they just came through the ground. His general practice was to manure the vines with 1 cwt. of bonedust and 1 cwt. of super. per acre when ploughing. On deep, sandy soil the use of super. only resulted in a marked increase in the crop of grapes. On stiff soils the manure should be put down as far as possible, but on deep, sandy soils the rain would take it down. He was of the opinion that the manuring of vineyards was a necessary and payable undertaking. In the discussion which followed, Mr. G. W. Warren expressed the opinion that manuring was profitable and essential, the best manures being stable manure and sheep dung. Every orchardist and vigneron should experiment with lime. The Hon. Secretary had used bonedust on old Cleopatra apple trees with marked beneficial results to foliage and fruit, and more so in the second year than the first. Mr. Lawrence, of Sandy Creek, had used bone super. at the rate of 300 lbs. per acre on vines. These vines were carrying 20 per cent. to 25 per cent. more fruit, besides being of a brighter green in the foliage.

MacGillivray, February 18.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, A. J. Nicholls, A. Stirling, sen. and jun., A. Sands, H. J. Wiadrowski, H. C. Williams (Hon. Sec.), and one visitor.

MIXED FARMING.—Mr. Stirling, sen., read a paper in which he advised the growing of cereals, such as wheat, barley, oats, and rye on ironstone rubble. The later especially was valuable as a stock feed when crushed. Wheat crops could not be successfully grown until the land had been thoroughly sweetened. Peas, lucerne, berseem, chow moellier, maize, sorghum, and potatoes could also be cultivated, but care should be exercised in the selection of seed for the latter crop. He had planted Rod Skin, Snowflake, and Pluto varieties, and the first had done extremely well. The crop averaged 9 tons to the acre. Turnips had also been profitably grown. For wool, he preferred the large-framed Merino ewes crossed with Lincoln rams. For lambs, however, the Shropshire ram was best. Pigs, cows, and poultry could be kept, and the value of a small orchard could not be overlooked. Mr. Wiadrowski discounted rye as horse feed if either fed whole or boiled, but he had not used it crushed. With potato-growing the worm pest was troublesome. Mangolds did well here. Mr. Nicholls had better results from Pinkeye potatoes than from Red Skin. They should be planted in wet ground, the seed being well shot. The Chairman advised the erection of ring fences where sheep were kept. Potatoes required humus, such as stable manure, &c. Birds were useful in killing the potato moth. It was reported that yacca country was proving capable of producing good crops of turnips. Chow moellier and lucerne should be grown. Rye made hardy greenfeed, and could be relied upon to yield up to 6 bush. after being fed off. A crop of rye and one of rape sown alongside each other in a 15-acre paddock had kept 150 sheep for 16 weeks. The time for planting rape, turnips, &c., was just before or with the first rains. The Leicester-Merino cross was favored by one speaker. In growing feed for stock, crops which could be grazed were preferable to those which demanded the extra labor of hand-feeding. Well-prepared land was necessary for potatoes. Strong seed only should be planted, and selection might be tried from the home crops instead of risking a change to seed of unknown source. Potash manure could be used to advantage, especially when ordinary super. or bonedust were sown with the seed. Mr. Ayris had experimented with the following mixture of manures:—One-third gypsum, two-thirds bone super.; one-third

gypsum, two-thirds Mount Lyell; one-third gypsum, two-thirds nitro super.; and gypsum. The results were approximately identical. A dressing of 7cwt. of lime made several years ago had ever since proved beneficial. Ordinary slack lime was apt to injure the seed if drilled in at seeding time. Ground lime was best. Lime burnt from shells with seaweed for fuel had been used by one of the members, who mixed it with Lawe's super. and applied from 50lbs. upwards of the mixture. The returns were good, and were best where the highest proportion of lime was added.

Meadows, February 24.

(Average annual rainfall, 34½in.)

PRESENT.—Messrs. Geo. Ellis (chair), J. Catt, E. Vickery, E. W. Milligan, J. Stone, W. J. Stone, N. A. Kleemann, A. L. Ellis, T. B. Brooks, W. Nicolle, J. Morris, F. Nottage, W. H. Bertram (Hon. Sec.), Rev. W. J. Williams, and one visitor.

HIDES AND WATTLES.—This subject was dealt with in a paper by Mr. W. Milligan. He emphasized the necessity for exercising considerable care in skinning beasts in order to prevent the value of the leather being depreciated. In the case of several animals the skin of the young was more valuable than that of the matured beast. The kid was an instance of this. The grain of the skin was fully formed at the time of birth. When the animal grew the skin expanded, with the result that the grain was not so close. The horse skin made a nice leather, and when put through a splitting machine it was very durable, and carried a good shine. Owing to the irregular supply, however, few tanners dealt with it. A great deal of the leather produced in Australia was ruined through the firebranding of the stock. There were two methods of tanning, viz., with wattle bark and with the chrome method. With the former, the operation took anything from six weeks to six months. The latter method was not so slow, but the product was not so good. With regard to the cultivation of wattles, he advised growers to gather the seed from the healthiest trees, preferably those with the rings around the butts. Wherever possible the soil should be loosened before the seed was planted, the seed having first been placed in boiling water. Where cultivation was not practicable, the seed should be sown dry and the scrub burnt over it. It was a good plan to sow a crop of wheat or oats with the seed; this protected the young plants. At four years the wattles should be thinned out. Diseased trees should be destroyed. Pruning was a good remedy where the nob trouble was encountered; it increased the back yield and strengthened the tree if carried out in the spring. Where wattles were attacked at the roots by the large white grub, or the beetle which bored into the trunk, it was advisable to cut the trees out altogether. Mr. J. Morris was of the opinion that the best means of securing seed was to chop halfway through the butt of a few of the wattles with straight stems, broad leaves, and thick bark, and pull the tops down, allowing them to remain on the stump until the seed matured. The sap concentrated in the seed, which could then be shaken into a washtub and afterwards tied up in a bag, where it could easily be knocked out of the pods with the aid of a stick. It was a mistake to broadcast seed and then set fire to the scrub, as a good deal of the seed would be destroyed. A better plan was to boil it and then sow it in the ashes after the scrub had been burnt. The best time to prune wattles was in the early spring. Mr. J. Stone considered that burning scrub after sowing seed cracked it, and this assisted the germination. This contention was borne out by the fact that it was generally after a fire that wattles commenced to grow. The Chairman thought the seed that grew so quickly after a fire was that which had been protected by a thin layer of soil. Mr. W. Nicolle had obtained good results by sowing 2lbs. of seed to the acre and then scarifying it in. Before sowing, the seed had been boiled.

Port Elliot, February 15.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. H. B. Welch (chair), J. F. Vinoc, H. Green, J. Chibnall, H. Welch, J. Brown, W. E. Hargreaves (Hon. Sec.).

IRRIGATION FROM WELLS.—In a short paper on this subject, Mr. Chibnall said that as a general rule a windmill could not be relied on to water more than one-quarter of an acre of land. The best soil for irrigation purposes was a good sandy loam with a clay subsoil not too close to the surface. On the river flats water percolated through the soil too quickly, and carried with it a part of the plant food. Well water also frequently carried a certain amount of mineral salts, and this eventually gathered in excessive

quantities in the soil. A simple test for ascertaining whether the mineral salts in the water were excessive was to plant lettuce or French beans during the summer. These would not thrive if the water were not fresh. There was a general tendency to use too much water when irrigating.

Uraidla and Summertown, February 3.

(Average annual rainfall, 42½ in.)

PRESENT.—Messrs. E. Hart (chair), W. Nicol, T. H. Collins, W. Dyer, H. G. Dyer, W. Squires, G. Prentice (Hon. Sec.).

MANURING FRUIT TREES.—Mr. W. Dyer, who stated that soil in this district was deficient in lime, considered that applications of super. and lime were very beneficial to fruit trees. Trees on manured land usually yielded superior fruit. Mr. Squires recommended applications of bonedust and lime. Where cherry-growing was largely carried on in the district, sulphate of ammonia was used with very good results, the fruit being large and the trees retaining a freshness very noticeable when compared with those that had not been manured.

Willunga, February 1.

(Average annual rainfall, 25½ in.)

PRESENT.—Messrs. Pengilly (chair), Binney, Bigg, and Hughes (Hon. Sec.).

PEAS FOR TOPPING OFF SHEEP.—Members discussed the subject of the value of peas for topping off sheep for market. The growing of peas for this purpose had been practised for the past 10 years or more in this district. Hitherto the crops had been raked and the peas stacked for thrashing out, or feeding to pigs with the haulms. The sheep then cleaned up the stubble. Some farmers were now coming to the conclusion that it paid to give the sheep the whole crop. They were not turned in until the peas were quite dry. Members could not call to mind a single case of a farmer coming out on the wrong side. As to the respective merits of varieties, it had been observed that where the small white pea (probably Early Sunrise) and the ordinary field pea had been sown in the same paddock the sheep thoroughly cleaned up the white before touching the other. On the other hand the field pea yielded a much larger bulk of fodder, and with the consequent larger root system it might be assumed that this pea was a greater enricher of the soil.

SOUTH-EAST DISTRICT.

Glencoe, December 23.

(Average annual rainfall, 33½ in.)

PRESENT.—Messrs. A. Dow (chair), J. Dow, J. T. Halliday, J. Riddoch, jun., W. D. Mitchell, W. Lehmann, W. Holloway, and G. F. Ferguson (Hon. Sec.).

CATERPILLARS.—The majority of members were agreed that poisoning with bran and Paris green was the most effective means of dealing with this pest. Mr. Lehmann had used a mixture of 1 lb. of arsenic with 1 bush. of bran with success. Mr. Mitchell dusted Paris green through a perforated tin over bran, and mixed this thoroughly with a rake, after which he added water. He had found it advisable to tie a handkerchief over the mouth and nostrils when mixing, to prevent the fine powder being inhaled. While some members thought systematic poisoning would eventually cope with the grub pest, others thought that with the large areas of grass land untreated there were likely to be visitations whenever the seasons favored the development of the caterpillars.

Glencoe, January 27.

Average annual rainfall, 33½ in.)

PRESENT.—Messrs. A. Dow (chair), W. Childs, J. Dow, J. T. Halliday, J. Holloway, G. F. Ferguson (Hon. Sec.), and one visitor.

FRUIT-GROWING.—In a paper on this subject Mr. J. T. Halliday said land for fruit-growing should be worked as deeply as possible. The trees should be planted about 16ft. apart, and pruned closely in order that they would be low and sturdy. Different trees required different methods of pruning. For instance, Five Crown pippin and Jonathan apples, which were low spreading trees, required to be pruned with the buds inwards. Rome Beauty and Dunn's Seedling, which were upright, were best pruned to outward buds. Bone manure or lime could be profitably dug or harrowed in directly after the leaves dropped from the trees, and stable manure should, whenever practicable, be spread over the land before the winter rains. The soil should be well worked during the early summer. The best varieties of apples for growing locally were Jonathan, Rome Beauty, Five Crown Pippin, Dunn's Seedling, Emperor Alexander, Cleopatra, and Dumelow's Seedling. Pears also did well, the following varieties being recommended:—St. Germain, Glou Morceau, Bartlett (Duchess). Plums were profitable, but unless there were plenty of stone in the ground, peaches and apricots would not do well. Mr. G. F. Ferguson thought that 16ft. was not sufficient space between the trees. His peaches and apricot trees were 18ft. apart and the limbs were interlocked. Peaches fruited splendidly, in spite of the curl leaf fungus. He had not been successful with apricots until this year, when the trees had been sprayed with Bordeaux mixture. Mr. J. Dow thought his apricot trees had been pruned too much, they made wood but the fruit did not set. Mr. Halliday recommended more summer and less winter pruning. Several members mentioned that a considerable amount of fruit had set on their quince trees, but had dropped off when only half grown. Mr. Childs stated that quince and cherry trees should not be pruned after the first two or three years.

EXHIBIT.—Mr. A. Dow exhibited a splendid specimen of Italian rye grass, which was 4ft. 6in. in length. He explained that this was one of the autumn catch crops sown on the experimental plots on his farm last year. It was sown in April and yielded a considerable amount of pasture until it was ploughed in in August, and the land sown to wheat. Some of the rye grass, however, survived the ploughing and was up level with the wheat at harvest time. He was very favorably impressed with it. Mr. G. F. Ferguson said Mr. Colebatch very strongly recommended it in preference to the perennial rye grass, as it grew so quickly and was so soon available for pasture, whereas the perennial rye did not establish itself so quickly.

**STEAMER AND BARGE ON MURRAY.**

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All communications to be addressed:

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Life Members of Agricultural Bureau.

On another page will be found a reproduction (reduced) of the certificate to be presented to persons elected as life members of the Agricultural Bureau. The presentation of the certificates is the outcome of a suggestion made by the Minister of Agriculture (Hon. T. Pascoe, M.L.C.) at the Conference of Northern Branches held at Crystal Brook in 1912. Speaking as a delegate from the Whyte-Yarcowie Branch, Mr. Pascoe urged that Branches should be empowered to nominate for the distinction of life membership gentlemen who for a number of years had rendered valuable and consistent service to the Bureau. The suggestion was approved by the Advisory Board of Agriculture, and subsequently it was decided that, except in special cases, persons before being eligible for election as life members must have been connected with the Bureau for 20 years. The certificate, which has been tastefully printed in colors by the Photo-Litho. Department under the supervision of Mr. A. Vaughan, was designed by Mr. C. Wall, of that department.

Northern Yorke's Peninsula Conference.

The Annual Conference of the Northern Yorke's Peninsula Branches of the Agricultural Bureau will be held in the Town Hall, Kadina, on Thursday, April 17th. The morning session, which will begin at 11 o'clock, will take the form of an open conference, at which papers will be read and discussions introduced by delegates from various Branches. The Minister of Agriculture (Hon. T. Pascoe, M.L.C.) will deliver an address, the Poultry Expert (Mr. D. F. Laurie) will deal with some phases of aviculture, and Mr. Henshaw Jackson (Wool Instructor) will speak on the subject of wool-classing for farmers. The Kadina Branch of the Bureau, in conjunction with the Northern Yorke's Peninsula Field Trial Society, will make all the local arrangements.

The Ridley Memorial.

An interesting ceremony took place at Roseworthy Agricultural College on Speech Day, March 14th, when the Minister of Agriculture (Hon. T. Pascoe, M.L.C.) unveiled a memorial of the late John Ridley, the inventor in 1843 of the stripper. The history connected with Mr. Ridley's invention is too

well known to need repetition. Suffice it to say that it revolutionised the practice of agriculture then in vogue and from it have been evolved several of the machines now in general use. The erection of the memorial is largely due to the efforts of the Roseworthy Old Collegians' Association. It consists of a marble bust of Mr. Ridley mounted on a granite pedestal, on the front of which is the inscription, "John Ridley, 1806-1887, inventor of the stripper." On the back are the words, "Erected by the Old Collegians' Association, with the help of friends." On one of the other faces is a line (engraved) sketch of the original stripper, and on the fourth is a similar representation of a modern complete harvester.

Two Famous Breeds of Cattle.

The two breeds of cattle for which Switzerland is noted are the Brown Swiss and the Simmenthal. The first breed is represented by some excellent herds in America, and is frequently seen in their live stock shows. In Europe it is very widely disseminated, and, next to the Holstein-Friesian, is the favorite dairy breed, or rather the dual-purpose breed, because there the single-purpose animal is not regarded with much favor. The European farmer wants a cow that will produce a large quantity of milk and a proportionately large quantity of beef. Frequently he is not satisfied even with that, but wants a cow that will make a good work animal. In some sections the work animals on the farm are almost exclusively cows. Brown Swiss heifers and cows are seen on every hand in Switzerland working both single and double, and they make fine, docile work animals. The Simmenthal breed is even more widely distributed in Europe than the Brown Swiss, and furnishes the typical triple-purpose cattle—that is, cattle prized for milk, beef, and draught power. This breed is a marked exception to the rule that the small, active breeds are developed in the mountainous countries where feed is often scant, and that the heavy, large breeds are developed in the low, fertile countries where pasture and forage are abundant. The Simmenthal cattle rank among the very largest, the mature cows weighing 1,500lb. to 1,700lb., and the bulls 2,200 lb. to 2,800lb. The mature oxen weigh 1,700lb. to 1,800lb., and are eagerly sought as work animals on the large farms. In milk production they rank high, and cows producing 10,000lbs. of milk per year are not at all uncommon. At the agricultural school at Ruetti, near Berne, a pure-bred herd of nearly 100 head of the Simmenthal breed is kept, and of this number forty-one cows make up the dairy herd. The average weight of the cows is 1,550lb., and the average milk production per cow last year was 8,822lbs., with a butter-fat content of 3.72 per cent. These figures are taken from the official published report of the school for 1911.

Milk Testing.

It is, perhaps, unfortunate that the mechanical testing of the milk should entail the employment of the terms percentage and cubic centimetre, both of which are apt to convey to the mind the impression of complicated arithmetical calculations. As a matter of fact no calculation or arithmetic enters into the process, and even the most illiterate person can make a reliable test with the exercise of ordinary care. The apparatus necessary for testing by the Gerber method is so accurately gauged that the measuring of the correct quantity of acid, milk, and alcohol is as simple as if the English instead of decimal system were employed, whilst the actual estimation of the fat percentage is no more difficult than the reading of the temperature by an ordinary thermometer.— *Live Stock Journal*.

Price of Wheat in England and Germany.

According to a statement made in the British House of Commons recently, the average prices of wheat in England and Germany from 1906 to 1911 were as follows :—

	Average per Imperial Quarter.					
	British.		Imported.		Germany.	
	s.	d.	s.	d.	s.	d.
1906	28	3	30	1	37	9
1907	30	7	32	11	43	10
1908	32	0	36	0	43	11
1909	36	11	39	8	48	2
1910	31	8	36	0	42	10
1911	31	8	34	0	42	2

In considering the above figures it should be remembered that the import duty on wheat in Germany is 11/10d.

Effect of Light on the Development of Fruit.

Experiments have been made to ascertain the influence that light exercises on the development of fruit, and the results are interesting. The experiments were made by letting the fruit ripen (1) in bags that shut out all rays of light ; (2) in transparent bags giving an attenuated light ; (3) fruit exposed to full daylight. The trials were made on grapes, cherries, pears, apples, &c. From the results it would appear that light is absolutely necessary only during the first stages of the formation of fruit and grain. After this initial stage had passed the fruit seems able to complete its development and maturity equally well in obscurity as in full light, although under the influence of the latter a greater amount of dry substance was acquired. It was observed that the best results were obtained when the growing fruit was under the influence of an attenuated light, and also that the acidity of the fruit was then diminished.—*Mark Lane Express Agricultural Journal*.

The World's Wheat Crop.

For the three years 1910-12 the world's wheat crops have been large, the total amounting to 1,341,000,000 quarters (a yearly average of 147,000,000 quarters), against a total of 1,199,000,000 quarters (yearly average of 399,700,000 quarters), in the three preceding years, 1907-9. The normal annual increase in food requirements is roughly estimated at 1 per cent., or between four and four and a half million quarters for the countries included in the above estimate.

Why Milk Records Pay.

The increased cost of raw material which is fed to the dairy cow to be turned by her into a finished product, and the apparently fixed price at which that finished product may be sold, make it necessary that, if in the future a profit is to be made, dairying must be carried on in a systematic and businesslike manner. Business and system require that all leaks where profits escape be eliminated and unnecessary expenditures of money be stopped. The two worst leaks on the modern dairy farm are the keeping of poor cows and the indifference that apparently exists as to the possibility of increasing the efficiency of the herd. The only way to eliminate these leaks is to weed out the poor cows and to practice such a system of breeding as will eventually improve the quality of the entire herd. How may the value of the different animals be determined? The only accurate index to a cow's value as a milk or butter producer is the milk record, kept in a conscientious manner. Though I thoroughly believe that it will pay every dairyman to keep records for every day in the year, I recognise the fact that, on account of the labor problem, the press of work, and so forth, daily record-keeping is not always practicable. In such cases a record of the weights of the milk from each cow should be kept for three consecutive days in each month, preferably about the middle of the month. The total obtained in these three days, multiplied by ten, will give a close estimate of the amount of milk that the cow has produced during the month. By repeating this work every month, and adding the totals at the end of the year, a fairly reliable approximation of the cow's value as a milk-giver may be obtained. - W. A. Cook, in the *Country Gentleman*.

Value of Horses in America.

The value of horses in America is, writes the *Live Stock Journal*, carefully appraised by the Government of that country, and some interesting results are brought to light. Thus, according to the Government reports, the average value of horses in the United States is 111 dols. 67 cents (£23), which is nearly 3 dols. (12s. 6d.) more than it was in 1910. The upward tendency is sufficiently

marked. Since 1899, for example, the average value of such horses has increased from 44 dols. 61 cents (£9) to the figure just cited, a gain of 67 dols. (£14) per head. This gain has been maintained in every year except one, when there was a loss of 10 cents per head between 1907 and 1908. The consistency of this enhanced price will thus be appreciated. Although Illinois is the first State with respect to the number of horses therein contained, it is worthy of note that the most expensive horses are found in Massachusetts and Rhode Island, where they average 148 dols. (£31) each. The gain in Massachusetts has been 20 dols. (£4) per head in one year, whilst the increase in Rhode Island has been 19 dols. per head. Horse-breeding in America has not lately been stimulated by Government measures, although this fact is not officially mentioned, and many thoroughbred yearlings have been sent to England for sale. There they have done fairly well.

The Iron Content of Milk.

In *Biedermann's Zentralblatt fur Agrikulturchemie* for November, 1912, is stated the divergencies in the results obtained by various experimenters as to the amount of iron in milk. The smallest content of iron was found when the cows were milked into glass vessels, and the highest in the marketed milk, the latter milk having stood in iron vessels. The iron content of the former milk varied between 0.4 and 0.7 mg. per litre, and averaged 0.5 mg. per litre. Human milk contains from one and a half times to twice as much iron as cow's milk.

Milking Goats.

The present revival of interest in goat breeding, says the *Agricultural Gazette*, which has reached its highest development in Germany, has been brought about by a variety of economic changes which have taken place in recent times. The first of these is the great increase in the number of small agricultural holdings, which have become a leading feature of modern rural life in Germany as elsewhere. The goat, in her character as "the poor man's cow," is an indispensable accessory to a small holding. The composition of goat's milk is said to render it peculiarly well adapted for the feeding of infants, and its use is already reported to have brought about a reduction in the rate of infant mortality in Germany. The objection commonly urged against goat's milk—namely, on account of its unpleasant odour—has been the subject of much inquiry in Germany, and competent authorities have come to the conclusion that this offensive quality is rarely, if ever, inherent to the milk itself, but is imparted to it from the contact with the animal's coat, the milker's hand, or the like. For this reason, short-coated goats are always

given precedence by show judges in Germany, it having been found that if such goats are kept carefully groomed and supplied with clean, dry bedding, and if strict cleanliness be observed by milkers, there need be no complaint as to the flavor of the milk. The daily milk yield of the goat is a very variable quantity, but it can be greatly increased by generous treatment in the matter of food. It is said that a goat should give at least ten times her own weight of milk in the year, whilst a cow is reckoned to give five times her own weight. Goats, it has been said, give as much as 176galls. of milk in the year, or from seven to ten pints a day during the period of lactation. It is quite possible by good care and feeding to get a yield of five and a quarter pints daily for from four to six months; indeed, cases are recorded of goats which gave twelve or fourteen pints per day. The average annual milk yield of German goats is about 110galls.

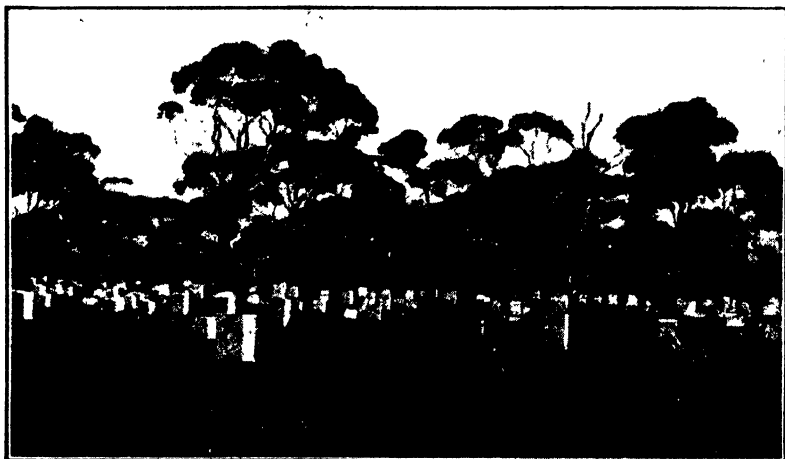
New Forage.

It should be remembered that a horse cannot be well fed on new forage, whether it is corn, hay, or straw. These cause much trouble, and they should not be used, even if cheap, and certainly not in stables where the maximum amount of work is demanded. With farm horses the case is rather different, but even these often have attacks of colic through eating heartily of this season's produce when just in from work. A bushel of old oats is better than 5 pecks of new, and this should be thought of when filling up the corn bins. On no account should cold well water be given in unlimited quantities, but the trough should be kept full and exposed to the air and sun. The working horse deserves his corn, and he should not be stinted. A sound, vigorous, and well-fed horse will withstand most ailments.—*Live Stock Journal*.

Straw as Fodder.

When judiciously used, straw possesses qualities of a very useful nature, too good to be wasted for litter, for which other material can usually be obtained. The fodder value of straw, even from the same kind of crop, may differ considerably. For instance, the straw from a winter wheat crop is not so good as that from spring-sown cereals. The latter is richer in digestible substances. Oat straw, as is generally recognised, possesses the highest value for feeding purposes, and is readily eaten by all animals. In the "chaffed" form it may be considered as a first-class supplementary fodder for horses and all ruminants, but when given to cows in large quantities it is said to convey a slightly bitter taste to the milk, and to produce butter of an inferior brand. The latter drawback can be removed by supplying with the chaff a certain quantity of rape cake or crushed oats. Barley straw is somewhat

similar to oat straw in composition. It is also eaten with relish, and is relatively easy of digestion. It seems quite suitable as fodder for cattle, but when fed to horses, unless mixed with hay, has been found to produce colic, and it has the further drawback that when put in the racks particles are liable to get into the horses' eyes. Rye straw is said to be harder and tougher than other cereal straws, but this is not altogether a disadvantage, as it obliges the horses to masticate better the grain mixed with it. Wheat straw is very similar to rye straw, but not so well liked by horses. Cows eat it more freely. The straw from peas and beans is more difficult of digestion than that from cereals, but contains more nourishment. It exercises, however, a constipating effect. The stems of vetches are particularly bad in this respect, and should be fed with caution. In general the straw or stems of leguminous plants is more suitable for ruminating animals, and especially for sheep, than for horses. It need scarcely be said that straw by itself is not sufficient nourishment for horses, as it contains too small a proportion of albuminoids. Sometimes during periods when there is little work for them on the farm it may be thought economical to spare other food by feeding the animals on good chaffed straw, but such a system must be strongly condemned. It is only as supplementary fodder that straw has a real value. As chaff, mixed about half and half with grain, it is valuable in forcing horses to chew their food more thoroughly, and thus to extract the greatest benefit from it. The size of the chaff for horses should be about half an inch long: if too fine it is not sufficiently masticated, and being too quickly swallowed, may give rise to indigestion and colic. Sometimes, if in case of need straw is given as a substitute for hay, it may be put whole in the racks, but when fed with grain it should always be chaffed and mixed with the corn.—*Mark Lane Express.*



Apiary of Mr. R. McDonald, Eyre's Peninsula.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

STOCK INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

Acute Indigestion.

"W.P.," Berri, has a mare, rising five, which suffers apparently with stoppage of water, goes down, rolls and groans, turns up her top lip, and appears to be in great pain. She is fed on hay, maize, and paddy melon. He asks for treatment.

Reply—The symptoms show that the mare is suffering from acute indigestion, the turning up of the lip suggesting liver trouble, which would follow on a diet of paddy melon, while green maize is often irritating to a horse's digestive system at certain stages of its growth, and if fed too freely. It would be well to feed the mare entirely on bran mash for three or four days, and give a pint of raw linseed oil after; then she could be brought on to hay and maize again, but no paddy melon. She should be fed three times a day and watered either before feeding or not till at least two hours after. Should she again show signs of pain, a pint of raw linseed oil and a quarter-pint of gin or whisky would probably relieve her.

The Bot Fly.

The Artherton Branch reports that a horse belonging to the neighbor of a member had died, and that as the result of a *post mortem* examination, about 100 bot flies were found in its stomach.

Reply—The note about bots is interesting, but the fact that 100 bots—not bot-flies—are found in the stomach of a dead horse are no more proof of their being the cause of death than a saddle under a patient's bed would point to his having eaten a horse. The bots are young and tender now, so that this is a good time to apply the treatment recommended in the article published in the January number of the *Journal of Agriculture*.

Chronic Indigestion.

"T. B.," Port Neill, asks the cause of horses eating their manure, although fed on good cocky chaff, with bran and pollard and a little salt and brown sugar. They get plenty to eat, but leave half and prefer manure a day or so old. They are poor, mattery-eyed, and mopish.

Reply.—The symptoms point to chronic stomach indigestion, most probably brought on by worms making ulcers in the lining of the organ; these are almost microscopic, and would be easily overlooked. Bots, too, may be part of the trouble. Treatment.—Hot bran mashes only for Saturday and Sunday, and then every Saturday night, and as soon as possible green-feed at least once a day; green stuff of any sort. Give each horse once a day in its chaff half an ounce of baking soda and a quarter ounce of saltpetre and a good pinch of ginger and black pepper. Give this for a fortnight and then stop it, and give instead 20 drops of veterinary tincture of arsenicum in the evening food for a month. When giving molasses do not give more than 5 per cent. of the weight of the daily food; the salt and sugar are just as good.

An Injured Horse.

A member of the Yongala Vale Branch desires to know whether the sinews of a horse (which had been cut with barbed wire and were fully an inch apart) would knit together again.

Reply.—No definite answer can be given without fuller particulars of age and length of time the injury has been done. Speaking generally, in a horse under three, with surgical treatment, such as bringing the severed ends together and antiseptic treatment of the wound, with or without splints, there is a very good chance of a good recovery; but in an older animal it is less certain, though if the wound is kept clean and dry with, say, half an ounce of tincture of arnica in a pint of methylated spirit till the wound is sufficiently healed to be dressed with tar, there is often a mend which would not have been expected.

A Callous Lump.

The secretary South Loxton Branch asks for treatment of a callous lump, about the size of a hen's egg, about 2in. above the knee joint of a filly, caused by a small cut about an inch above the lump. The injury occurred some three or four weeks ago and has since healed.

Reply.—Presuming that the swelling is in front of the leg, there is every probability that an oil sac (synovial bursa) has been injured, and that an abscess has formed. This is one of those cases in which it is impossible to give sound advice without inspection, as great harm might arise if the lump were opened by anyone not knowing the anatomy of the part. It would, however, be well to foment the swelling with very hot water once a day and then paint it with tincture of iodine. Continue this treatment for a fortnight, and then report progress.

Probable Case of Pleurisy.

"A. J. M.," Yeelanna, states that he has an eight-year-old mare which has gone off her feed for a week and has fallen away from good to very low condition. She does not appear to be in any pain, but has not lain down, is very sluggish, and moves about very little, and is stiff in the legs, especially in front, stands with her legs wide apart or one forward, and seems at times to strain as if to pass urine.

Reply—The symptoms, well described, seem to point to pleurisy (inflammation of the lining of the chest), which passed unnoticed in the earlier stages and is now probably far advanced, with a collection of some gallons of fluid between the chest wall and the lungs, and one cannot be very hopeful of her recovery, as she eats nothing. As treatment, 10 drops of veterinary tincture of aconite placed upon the tongue in a little water or sugar morning and evening, and the same quantity of tincture of arsenicum at noon and night, might bring on her appetite, but it is doubtful. Probably the first thing she will fancy, if she mends, will be a few blades of greenstuff.

Worms in Horses and Poisoning Rabbits.

The members of the Green Patch Branch of the Agricultural Bureau have made a practice of using one cube of ordinary washing blue (indigo) as a dose for treating worms in horses. They desire to know whether this treatment is in any way injurious to horses. They are also anxious to know whether poison composed of strychnine and raspberry jam prepared for rabbits is in any way injurious to cattle; and also whether poisoned wheat is likely to be injurious to stock?

Reply—The use of ordinary washing blue as a remedy for worms in horses is not fraught with any danger, and is to some extent useful, mainly on account of the soda it contains. The blue coloring matter is very seldom indigo nowadays, being generally an aniline dye, and is known to be obnoxious to some parasites which live in the blood; so there is a possibility it is so also to worms, but there is at present no direct scientific evidence on that point. If any worms, having a blue tinge, are found after its administration, it would be helpful if they were sent to the Secretary Advisory Board, wrapped in butter cloth damped with a weak solution of any coal tar disinfectant; not in spirit, which would destroy the color. There is a great risk of poisoning from strychnine and jam as prepared for rabbits, and cattle should be kept away from such baits. Poisoned wheat is decidedly dangerous if consumed in sufficient quantity. In case of accident from either cause, get the bowels opened as quickly as possible and give plenty of milk and coffee.

Treatment for Piles and Blood Worms.

The Koppio Branch of the Agricultural Bureau is anxious to ascertain the cause of a mare passing blood through the fundament. The mare in question had a foal two years ago. The blood passed from her a few drops

at a time at frequent intervals during the day. Would it be detrimental to breed from the animal? The members further desired to know whether turps and oil could be safely given to mares or foals for blood worms?

Reply— The passing of blood, a few drops at a time, from the mare's fundament is indicative of piles, and it is advisable to keep her bowels very loose with a large quantity of bran or daily bran mash. It will also be well to give her a teaspoonful of extract of witch hazel or hamamelis in her food morning and evening. The malady should disappear as the general health improves, and would not be detrimental to her breeding. Turpentine and oil may safely be given to mares for worms if due care is taken in its administration; but any purgative given to a mare heavy in foal is somewhat risky. The same drugs may be given to foals in smaller doses; but castor oil would be safer and more efficient, omitting the turpentine. Fowler's solution of arsenic in 1oz. doses for an adult and $\frac{1}{4}$ oz. for a foal given once a day as recommended is better for both.

SICK DUCKLINGS.

"Moonta" states that she had some ducklings hatched on December 27th, 1912. They did splendidly until about eight weeks ago, when they commenced to roll about from side to side, and some could not stand, although they ate heartily. She has lost several, and asks for treatment.

Reply Your general treatment of the ducklings seems all right. Do you keep a supply of water where they can get it at night? This is important, because if they have no water to drink during the night they become very thirsty, and after a drink in the morning show some of the symptoms you describe. The water in the drinking vessel should always be deep enough to permit the ducklings to completely immerse their heads; this prevents the sore eyes. Scald out the water vessels and rinse them with a strong solution of permanganate of potash.

ROUND WORMS IN POULTRY.

"T. B.," Port Neill, asks for information in regard to a disease from which his poultry are suffering. The young ones go blind, the others mope, throw their head back, lose the use of their legs, and finally die. They have plenty of food, large yard, and scratching material, and generally are well looked after.

Reply Your birds are evidently infested with round worms, which have been very troublesome this year. Obtain from a chemist the following powder:—Santonine, one part; ground areca nut, seven parts, by weight. Mix in sufficient bran and pollard to give them a short feed, for every 20 fowls one heaped teaspoonful of powder. Mix in the dry bran and pollard, then moisten with water to a crumbly mass. Do not feed on the previous night, so that the birds are hungry. Repeat dose in a week. You may give sick birds, in a pollard pill, as much powder as will lie upon a sixpenny piece. As a rule, when they are in the condition you describe they are past curing. You can, however, save the balance.

ROSEWORTHY AGRICULTURAL COLLEGE.

EXPERIMENTS BEARING ON FEEDING OFF CEREAL CROPS WITH SHEEP.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College, and
W. J. SPAFFORD, Assistant Experimentalist.

INTRODUCTORY.

Some few years back the local agricultural atmosphere appears to have been permeated with the opinion that to feed off a cereal crop with a flock of sheep, besides satisfying the natural cravings of the latter, presented the additional advantage of materially improving the grain yield, if not the hay yield of the overrun cereal crop. It seems probable, too, that at the time, we, at the Roseworthy Agricultural College, became more or less infected with this popular opinion, which implied that one might both eat one's cake and have it at the same time. At all events the inconvenient possession of a hungry mob of sheep is apt in years of feed-scarcity to engender the wish that is father to the thought. Such, evidently, must have been our position in 1907, when, perhaps more from necessity than from settled conviction, the great bulk of our feed crops was systematically fed down with sheep; and it may be added that whatever the advantages to the flock, at harvest time we acquired the moral certainty that the crops had not in any way benefited by the practice. Thus, a crop of Calcutta oats had been fed down with sheep at the rate of eight to the acre between July 21st and 28th. At harvest time they were not judged worth reaping. A hay crop (a mixture of wheat and oats) was similarly treated and yielded only 1 ton 15cwts. 108lbs. to the acre in a season that promised far better things. A barley crop sown on fallow land was fed down between July 19th and August 1st at the rate of a little over six sheep to the acre, and yielded at harvest time 29bush. 45lbs., whilst a field sown to the same variety and that had not been fed down yielded 41bush. to the acre. Another field sown to various varieties of wheat and fed down at the rate of over 20 sheep to the acre between June 5th and 7th, and again between June 16th and 21st at the rate of 24½ sheep to the

acre, yielded at harvest time only 7bush. 37lbs. to the acre. Yet another field, however, sown to other varieties of wheat and fed down with sheep at the rate of five to the acre between June 24th and July 3rd, yielded at harvest time 17bush. 13lbs. to the acre, which was fairly satisfactory for the season.

On the other hand, in 1905, circumstances had given us a limited acquaintance with the same practice, with ultimate results that were highly satisfactory. A field of barley that had been sown early in May made very rank early winter growth; and by the end of June rough, stormy weather had laid the crop flat against the ground, where the great bulk of it was in danger of rotting away; hence, both from necessity and settled conviction, we were compelled to feed off this crop with sheep at the rate of 30 to the acre between June 28th and July 4th. Within a fortnight of the removal of the flock the crop had recovered, and at harvest time Six-row barleys averaged 51bush. 9lbs. of grain and 3 tons 6cwts. 47lbs. of total produce to the acre, and imported Two-row malting barleys 45bush. 10lbs. of grain and 2 tons 18cwts. 43lbs. of total produce to the acre.

Thus, then, the results noted in the two seasons—1905 and 1907—were opposite in character; eminently favorable to feeding off in the first instance, and quite the reverse in the other. It seems fairly evident, therefore, that apart from the pressing requirements of a flock of sheep short of feed, the feeding off of a cereal crop may have its benefits in special circumstances, if taken advantage of at the right time of the year and if favored by the character of the season in which it happens to be resorted to. And it was with a view to determine within what limits the feeding off of cereal crops might be carried out with safety, or even with advantage, that we undertook a series of continuous experiments on the subject in 1908, 1909, and 1910. It is the result of these experiments that we propose discussing in the following paper.

PLAN OF THE EXPERIMENTS.

We shall now describe briefly the plan on which these experiments were carried out. In each season—1908, 1909, and 1910—we sowed one-twentieth of an acre of each of the cereals we wished to test; this twentieth of an acre was subsequently divided up into five plots of equal dimensions. In each case plot 1 was allowed to make natural growth and was not touched, whilst the four other plots were cut down close to the ground with a scythe at intervals of 10 to 12 days. This mode of treatment is illustrated below in Fig. 1, in which is indicated diagrammatically the general treatment and yields of Calcutta oats in 1909. It will be noted that plot 1 was not touched; that plot 2 was cut down on June 21st, *i.e.*, as soon as the crop appeared sufficiently advanced to be fed off by sheep under ordinary field conditions; plot 3 on June 30th; plot 4 on July 15th; and plot 5 on July 23rd. All that need be recollected in this connection is that in each season the treatment of all cereals tested was similar to that indicated in Fig. 1 for Calcutta oats.

FIG. 1.—*Showing Treatment and Yields of Calcutta Oats in the course of the 1909 Experiments.*

Plot 1—Uncut ; total produce, 126lbs. ; total grain, 32lbs.

Plot 2—Cut June 21st ; total produce, 111lbs. ; total grain, 30lbs.

Plot 3—Cut June 30th ; total produce, 100lbs. ; total grain, 29lbs.

Plot 4—Cut July 15th ; total produce, 67lbs. ; total grain, 15lbs.

Plot 5—Cut July 23rd ; total produce, 66lbs. , total grain, 14lbs.

We are, of course, aware that it may perhaps be objected that cutting down a crop with a scythe is not feeding it off with a flock of sheep. The differences, however, are more apparent than real, and, in our opinion, are not such as to affect our results, nor the conclusions we propose drawing from them. There are, perhaps, two advantages that will be claimed for feeding off with sheep, and in which cutting down a crop can have but little or no part. It may be argued that sheep whilst feeding off a crop return to the soil excreta which will have the effect of a light top-dressing. In our view, however, the influence in this direction of five to ten sheep to the acre for an outside period of six to seven days will be so small as to be in this connection more or less negligible. It may also be stated that sheep will help to consolidate soil, which, if the latter is at all loose and open, is always an advantage to the crop. This, however, is a contingency that did not present itself in our experiments, and in our view, therefore, cannot affect the results.

On the other hand, there is no doubt that the chief object aimed at in feeding off a crop—usually an over-rank crop—is to check its growth temporarily, and prepare the way for a healthier and sturdier second growth ; and, independently of questions of expense and general feasibility, it appears to us immaterial whether the work is carried out with the teeth of sheep or with the blade of a scythe or mower. Indeed, in some respects the blade of the scythe or the mower is incomparably superior for the purpose. It will come within the experience of all who have paid any attention to the matter, how tenaciously a flock of sheep clings to the poorer grown portions of a crop, eating them down bare to the ground, whilst they wholly neglect, or merely tread down, the ranker portions, which, in reality, alone stand in need of being fed off ; hence, in our view, for completeness and regularity of work, the scythe would be infinitely more reliable than a flock of sheep. Apart from this, however, circumstances were such at the time that we could not adopt any other method for handling these experiments, and we are satisfied that the results secured represent a fair example of what may, under our conditions, be expected in ordinary practice.

SIZE OF THE PLOTS.

In work of this kind, if results are to be at all comparable in point of method and time, a considerable amount of hand labor is involved ; and with many other prior claims to be attended to, it becomes quite impossible to deal satisfactorily with anything but very small plots. We quite realise that

fraction of an acre plots are very far from being as convincing as those in excess of an acre; the latter, unfortunately, are unworkable, except for special purposes, and in the present experiments were quite beyond our reach. We have the hope, however, that the unavoidable errors that attach to small plot work will be compensated for in the fact that the work was made to extend over three consecutive seasons, the mean of which should approach fairly closely to normal results.

At the same time, since no more was sought than a fair comparison between plots that had been cut down and those that had not been so treated, we shall give no more than the actual yields noted, and shall refrain from translating them into yields per acre. It is, of course, open to others to do so if they think fit. To us, however, it appears unnecessary.

THE THREE SEASONS.

Since these experiments extended over three years, we shall, in the course of our examinations of the results, be called upon to note what may be termed "seasonal" differences. It becomes necessary, therefore, to recall the peculiarities of the three seasons—1908, 1909, and 1910—and particularly those special features of the weather that appear to exercise some influence on the growth and development of crops that have been fed off.

In Table I. below we have summarised various data which characterised the three seasons in question in a general way; they include both rainfall data and the average yields of the principal College farm crops.

TABLE I.—*Enumerating Characteristic Rainfall and Cropping Data for 1908, 1909, and 1910.*

	1908.	1909.	1910.	College Averages.
Seeding rains (April-May)	4.12in.	4.80in.	3.43in.	3.63in.
Winter rains (June-July)	4.31in.	5.64in.	5.67in.	4.60in.
Spring rains (Aug.-Oct.)	7.03in.	8.63in.	6.51in.	5.45in.
Early summer rains (Nov.)	0.07in.	2.08in.	1.18in.	1.01in.
"Useful" rainfall (April- November)	15.53in.	21.15in.	16.79in.	14.68in.
Total rainfall	17.74in.	23.05in.	23.87in.	17.71in.
Average wheat yield per acre	22bsh. 14lbs.	25bsh. 5lbs.	16bsh. 38lbs.	18bsh. 39lbs.
Average hay yield per acre	2t. 7c. 5lbs.	2t. 15c. 68lbs.	2t. 7c. 31lbs.	2t. 6c. 42lbs.
Average barley yield per acre	43bsh. 49lbs.	35bsh. 0lbs.	37bsh. 9lbs.	34bsh. 45lbs.
Average oat yield per acre	22bsh. 28lbs.	43bsh. 19lbs.	28bsh. 15lbs.	30bsh. 9lbs.

Thus, then, it will be seen that all three seasons were particularly favorable seasons, and particularly to crops that had been fed off or cut down, since the winter rains were plentiful and the spring rains in excess of the normal; indeed, the latter may be described as having been very abundant. They were seasons, too, in which the crop yields were, on the whole, very satisfactory. The wheat yield of 1909 is the highest ever recorded on the College farm. There are, however, a few other seasonal factors not without influence on the development of crops that have been fed off that we shall now have to consider more in detail.

SEASON 1908.

In 1908 the various plots were sown between April 20th and 23rd, after the fall of three-quarters of an inch of rain between the 15th and 21st. Germination was almost immediate, the sprouted plants showing up regularly above ground between the 2nd and 6th of May. Seeding and germination, therefore, may be said to have taken place under the best possible of conditions, and the early start given to these plots should have proved favorable to that rankness of growth which at times renders the feeding off of a crop so advantageous.

May was an exceptionally wet month, registering 3.36in. of rain as against a normal average of 1.85in. The weather generally was mild, only three light frosts being registered on the 27th, 29th, and 31st.

The rainfall in June was about normal, being represented by 2.83in., distributed over 13 wet days. Frosts were, on the whole, numerous, and in some cases rather severe; their influence was in the direction of checking any tendency towards exaggerated rankness of growth. Twelve frosts were recorded, the most severe occurring on the 7th (25° F.), on the 2nd (27° F.), and on the 3rd, 24th, and 27th, on each of which the mercury lowered to 28° F.

The first cut was made in the various plots so soon as the general condition of growth was judged to warrant it. This took place between June 29th and July 9th, according to the condition of the several plots. The second lot of plots were cut down between July 7th and 18th; the third lot between July 20th and 25th; and the fourth between July 31st and August 3rd. In taking into consideration the results that will be given later on, it will be necessary to weigh the influence of both the rain that fell after a cut and of such frosts that may have followed. We think it necessary, therefore, to indicate in detail both frosts and rain occurring between June 29th and the end of August. These data are summarised below in Table II.

TABLE II.—*Indicating Rain and Frosts between June 29th and August 31st, 1908.*

Dates.			Dates.		
	Rain.	Frosts.		Rain.	Frosts.
	In.	Deg. F.		In.	Deg. F.
June 29	—	31	August 1	—	32
July 2	0.27	31	August 3	0.13	—
July 3	0.02	30	August 4	0.03	—
July 5	0.05	—	August 5	—	27
July 6	0.02	—	August 6	—	28
July 8	0.05	—	August 7	—	31
July 9	0.62	—	August 9	0.06	—
July 10	0.07	—	August 12	—	32
July 11	0.02	—	August 17	0.24	—
July 12	0.05	30	August 18	0.07	—
July 13	0.05	29	August 21	0.28	—
July 15	—	30	August 22	0.75	—
July 19	0.03	—	August 24	0.09	—
July 21	0.10	—	August 25	—	25
July 22	0.12	30	August 26	—	26
July 24	—	25	August 27	—	27
July 26	—	25	August 28	0.06	—
July 27	—	26	August 29	0.04	—
July 28	—	26	August 31	0.04	—

Thus, between June 29th and August 31st there were 19 frosty mornings, on some of which the frost was sufficiently keen to interfere with the growth of crops recovering from the operation of being cut down close to the soil. During that interval of time, too, there fell 3·36in. of rain, distributed over 24 rainy days; this represents a fall about half an inch below the usual average, which was compensated for, however, by rains above the average in the May-June period.

SEASON 1909.

In 1909 the plots, which were reduced in number, were sown on April 20th and 21st, immediately after the fall of one-quarter of an inch of rain, followed up between the 25th and the 30th by 1½in. Germination took place, therefore, under favorable conditions between the 1st and 2nd of May. It is to be noted that in this season, too, the plots got an early start, calculated in favorable circumstances to lead to rather rank growth.

As was the case in 1908, May was again, in 1909, a very wet month; 2·89in. of rain were registered as against a normal average of 1·85in. The weather was very mild and no frosts were registered during the course of this month.

The rainfall during June was below the average by about an inch, and throughout the weather proved very mild, only three light frosts being registered. The mild weather of the early winter led to rather early rank growth, with the result that it was possible to cut down the first plots earlier than in the preceding season.

The first plots were cut down between June 11th and 21st, the second plots between June 25th and 30th, the third plots between July 9th and 15th, and the fourth plots on July 23rd.

We append below in Table III. details concerning rain and frosts registered between June 11th and July 31st.

TABLE III.—*Indicating Rain and Frost Registered between June 11th and July 31st, 1909.*

Dates.	Rain. In.	Frosts. Deg. F.	Dates.	Rain. In.	Frosts. Deg. F.
June 11	—	31·2	July 7	0·10	—
June 13	0·34	—	July 8	0·01	31·0
June 14	0·01	—	July 11	0·25	—
June 15	0·03	—	July 12	0·20	—
June 17	0·20	—	July 14	0·01	—
June 19	0·34	—	July 15	0·35	—
June 20	0·02	—	July 16	0·20	—
June 21	0·04	—	July 19	0·01	—
June 23	0·06	—	July 20	0·07	—
June 24	0·24	—	July 21	0·18	—
June 25	0·21	—	July 23	0·15	—
June 26	0·03	—	July 25	0·04	—
June 27	0·08	—	July 26	0·48	—
June 28	0·01	—	July 27	0·35	—
June 30	—	29·8	July 29	0·27	—
July 1	—	30·6	July 30	1·03	32
July 2	—	28·5	July 31	0·10	—
July 3	—	31·1			

Thus, after a comparatively dry June, the rainfall in July, 3·80in., distributed over 17 rainy days, was very much in excess of the average. It should be noted, too, that over the period that at present interests us frosts were rare and when registered very mild. Conditions generally, therefore, were more favorable in 1909 than in 1908 to strong, rank growth; and it follows that, so far as can be judged from these data, the crops were more likely to benefit from being fed off than was the case in 1908.

SEASON 1910.

Seeding rains came rather late in 1910, and the plots were not sown until May 18th, after a fall of about half an inch, distributed over six days. Heavy rains fell towards the end of the month, and the plants showed regularly above the ground on May 27th and 28th. The total May fall, 3·20in., was very heavy, being an inch and a third above the usual figure for this month. The weather was mild, no frosts being recorded. June rainfall was about normal, with only one frosty day recorded. July was about three-quarters of an inch above the normal mean, and showed only three frosty mornings.

The plots were not ready for cutting until July 9th to 11th; second cuts were made on July 25th, third cuts on August 8th; and fourth cuts on August 18th. We give below in Table IV. a record of rain and frosts occurring between July 9th and August 31st.

TABLE IV.—*Indicating Rain and Frosts Registered between July 9th and August 31st, 1910.*

Dates.	Rain. In.	Frosts. Deg. F.	Dates.	Rain. In.	Frosts. Deg. F.
July 9	0·03	—	July 29	0·02	—
July 10	0·33	—	July 30	0·18	—
July 11	0·02	—	July 31	0·11	—
July 12	0·01	—	August 1	0·12	—
July 13	0·29	—	August 2	0·02	—
July 14	0·02	—	August 4	0·02	—
July 15	0·07	—	August 9	0·06	—
July 16	0·08	—	August 10	0·06	—
July 17	0·25	—	August 12	0·10	—
July 18	0·03	31·2	August 18	0·18	—
July 20	—	31·6	August 19	0·22	—
July 22	0·06	—	August 21	0·02	—
July 23	0·03	—	August 24	0·30	—
July 24	0·04	—	August 25	0·15	—
July 25	0·04	30·5	August 29	0·06	—
July 27	0·70	—	August 31	0·01	—
July 28	0·47	—			

In 1910, therefore, late seeding led naturally to comparatively late cutting down of the plots; those cut in July had the advantage of heavy rains in the latter part of this month; whilst those cut in August had to run the gauntlet of a relatively dry month. In both months the weather generally was very mild, not a single frost being recorded for August.

OATS.

Earlier field experience at the College appeared to show that oats, to a greater degree than any other cereal, suffered from unseasonable feeding off with sheep, and, accordingly, in these experiments of ours oats were given the chief position, wheat and barley being included merely for purposes of comparison. In 1908 we gathered together, for the purpose of these experiments, as many varieties of oats as we could lay hand on, and in this first season oats were represented by 14 distinct varieties. In this number were included many varieties without any particular local value; and, as the labor required by a large number of plots was rather more than we could conveniently spare for the purpose, in 1909 and 1910 the oats were reduced to what appeared to be the six most promising varieties. We shall, in the first place, give our attention to the six varieties present in all three seasons of the experiments. These varieties, placed in order of earliness of development, are as follows:—Cape oats, Champion oats, Algerian oats, Calcutta oats, Garton oats, and Clydesdale oats.

CAPE OATS.

This is a well-known variety of oats which proved by far the earliest of those raised by us in the course of these experiments. For the three seasons the average number of days between germination and full bloom was represented by 140 days, and between full bloom and the ripening of the grain by 40 days, with a total of 180 days, or six months, for the full period of growth. Full details concerning the data collected are shown below in tabular form.

TABLE V.—*Showing 1908 Data for Cape Oats Cut Down in Various Stages of Growth.*

Seeding, April 21st; Germination, May 5th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain.	Total Produce.
				lbs.	lbs.
1	Not out	September 30	November 6	9.00	27.75
2	July 2	October 4	November 8	5.75	20.00
3	July 13	October 8	November 9	5.50	19.25
4	July 21	October 10	November 9	4.50	10.00
5	August 1	October 11	November 11	6.75	17.50

We see that in 1908 the yields of Cape oats, both in grain and total produce, were highest where the crop had not been cut down; and that, with the exception of plot 5, which may be abnormal, the yields were reduced in proportion to the lateness of cutting down. The abnormal result of plot 5 may perhaps be explained on the following lines. If reference is made to Table II., in which are set out both rain and frosts registered during this period, it will be noted that plots 2, 3, and 4 were each cut down during the course of several frosty days, which were not followed up by heavy rains.

Frosty weather obtained, it is true, shortly after the cutting of plot 5; it was retrieved, however, by the heavy rains of the latter end of the month. We wish to draw particular attention to this point, since during the course of these experiments we repeatedly observed that heavy frosts had the effect of checking very considerably the growth of plots that had been recently cut down. This is a point of considerable practical importance. Frosty weather is almost invariably dry weather; hence it represents the time when alone it is possible to feed down crops with sheep without doing irreparable injury to the crops. It would appear, therefore, that whilst one is bound to select dry weather for feeding off a crop, it is as well, as a rule, to avoid keen, frosty weather for the purpose.

TABLE VI.—*Showing 1909 Data for Cape Oats Cut Down in Various Stages of Growth.*

Seeding, April 20th; Germination, May 2nd.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	September 21	November 4	30-00	86-00
2	June 21	September 30	November 7	23-00	83-00
3	June 30	October 6	November 8	20 00	57-00
4	July 15	October 10	November 11	16-00	38-00
5	July 23	October 15	November 22	9-00	27-00

Again, in 1909, the yields of Cape oats were highest where the crop had not been cut down; and the reduction in yields of the plots that had been cut down was in proportion to the lateness of the operation. A reference to Table III. will show that frosts during the period under consideration were, on the whole, insignificant; the only plot that was cut during a relatively frosty period was plot 3, which, however, reaped the benefit of rains falling shortly afterwards.

TABLE VII.—*Showing 1910 Data for Cape Oats Cut Down in Various Stages of Growth.*

Seeding, May 18th; Germination, May 28th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 4	November 10	8-44	36-00
2	July 11	October 4	November 12	6-69	37-00
3	July 25	October 6	November 14	11-06	36-00
4	August 8	October 10	November 14	3-56	17-00
5	August 18	October 12	November 14	1-75	6-00

The 1910 results are not as regular as those of the preceding two seasons. Yields of total produce are approximately equal in plots 1, 2, and 3, the first of which was not cut down; whilst there is a very pronounced falling off in yields in the later cut plots. The grain yield of plot 3 is considerably

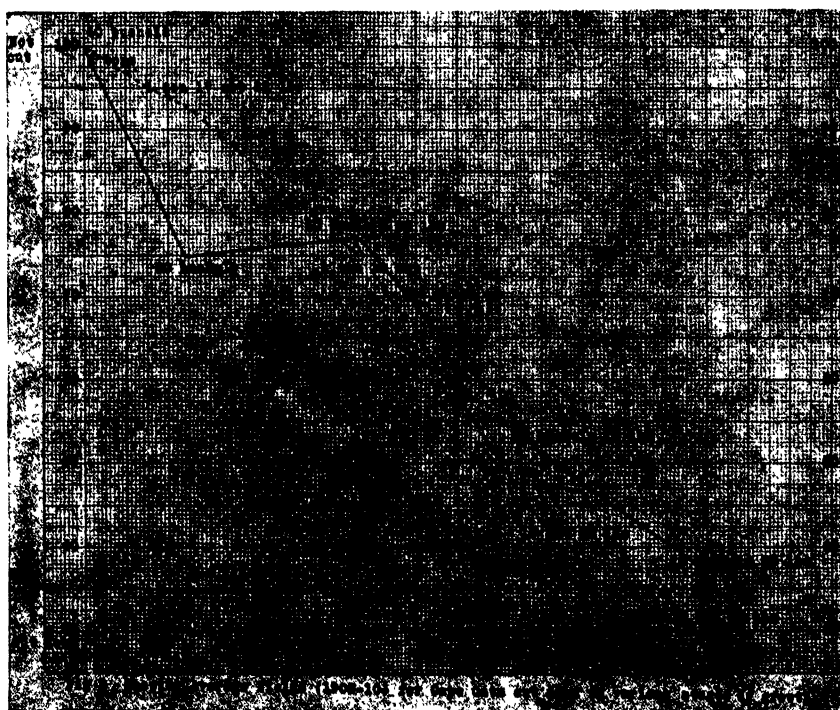
higher than that of the plot that was not cut down, and is, perhaps, abnormal. It should be noted that whilst the two plots cut down in July were helped along by rain falling shortly after they had been cut, such was not the case with the plots dealt with in August. This fact will have served to accentuate the ill effects of late cutting or feeding off.

Now, if we take the three seasons and average out the results we shall secure the mean figures that are indicated below in Table VIII.

TABLE VIII.—*Showing Average Results for Cape Oats Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain.	Grain	Total Produce.	Total Produce
			in terms of Plot 1 taken as 100.		in terms of Plot 1 taken as 100.
		lbs.		lbs.	
1	Not cut	15.81	100	49.92	100
2	July 1	11.81	75	46.87	93.6
3	July 14	12.19	77	37.42	75
4	July 25	8.02	51	21.67	43
5	August 4	5.83	37	16.83	34

The average figures in Table VIII. are fairly regular, and confirm the view that the yield of Cape oats, either as grain or as hay, is likely to be all the heavier for being left untouched. The figures in the third and fifth columns,



in which the yields are expressed in terms of plot 1 taken as 100, serve to indicate the proportions in which a reduction of yield may be anticipated as the result of cutting down or feeding off of Cape oats. Thus, if a crop that had not been touched yielded 40bush. of oats to the acre, we should expect from crops that had been fed down no more than 15bush. to 30bush., according to the time of the year the crop happened to have been fed down.

This depressing influence on yields of feeding off a crop is, perhaps, more strikingly brought out in the accompanying diagram (Fig. 2). In this diagram the average figures of Table VIII. are represented by curves, the gradual descent of which emphasizes the depression of the yields. To make the matter clearer it has been assumed that the crop which had not been fed down would have yielded 40bush. to the acre; and the yields of the other plots have been indicated proportionately. The curve in dotted lines represents the total produce yields, for which we have assumed a yield of 2 tons to the acre for the plot which had not been touched, and for the others a correspondingly proportional value.

Attention should be drawn to the fact that cutting down or feeding off a crop by checking its vegetation has the effect of retarding both the time of full bloom and that of the ripening of the grain. In our experiments with Cape oats in 1908, the extreme differences proved to be 11 days for full bloom and five days for the ripening of the grain; in 1909, 24 days for full bloom and 18 days for the ripening of the grain; and in 1910, eight days for full bloom and four days for the ripening of the grain. These differences are sufficiently pronounced to have very considerable influence on yields in certain seasons.

CHAMPION OATS.

This is an early oat, comparatively new to the district. During the three years of the experiments the average number of days between germination and full bloom was for Champion oats, 163; and between full bloom and ripening, 24 days; making a total of 187 days for the full period of growth. Champion oats are, therefore, about a week later than Cape oats.

TABLE IX.—*Showing 1908 Data for Champion Oats Cut Down in Various Stages of Growth.*

Seeding, April 21st; Germination, May 5th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 24	November 13	7.25	32.25
2	July 8	October 27	November 16	9.00	25.75
3	July 16	October 27	November 16	6.25	17.00
4	July 24	October 30	November 17	8.50	20.00
5	August 1	October 30	November 19	6.00	16.00

It will be noted that, so far as Champion oats were concerned, the reduction in yields in the matter of total produce was fairly regular in 1908 in the plots that had been cut down. On the other hand, plot 2, cut down on July 8th, gave a higher grain yield than the plot that had not been touched. A reference to Table II. will show that this plot was cut down immediately before a fairly heavy rain, and at a time when no frosts were recorded.

TABLE X.—*Showing 1909 Data for Champion Oats Cut Down in Various Stages of Growth.*

Seeding, April 20th ; Germination, May 2nd.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 16	November 15	20-00	105-00
2	June 21	October 18	November 17	20-00	96-00
3	June 30	October 18	November 19	21-00	85-00
4	July 15	October 20	November 20	20-00	83-00
5	July 23	October 21	November 20	23-00	72-00

Again, as in 1908, we notice that the highest quantity of total produce was secured where the Champion oats had not been cut down, and that among the plots that had been cut down the yield was heaviest the earlier the operation had been carried out. On the other hand, the grain yield does not appear to have been affected in the slightest degree by the operation ; indeed, plots 3 and 5 show a higher yield of grain than the untouched plot.

TABLE XI.—*Showing 1910 Data for Champion Oats Cut Down in Various Stages of Growth.*

Seeding, May 18th ; Germination, May 28th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 26	November 17	11-50	82-00
2	July 11	October 26	November 17	6-69	63-00
3	July 25	October 28	November 17	6-44	62-00
4	August 8	October 28	November 22	5-25	60-00
5	August 18	October 28	November 22	4-44	43-00

The 1910 season proved wholly unfavorable to the cutting down of Champion oats. This is all the more remarkable, inasmuch as the results of the preceding two seasons were, on the whole, favorable to the operation in the matter of grain yields, providing the crop be cut down fairly early in the season. It is true that in 1910 the plots were sown very late owing to the lateness of the autumn rains, and it seems probable that the plots that were cut down did not find time to recover from the operation.

TABLE XII.—*Showing Average Results for Champion Oats Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Total Produce.	Total Produce in terms of Plot 1 taken as 100.
		lbs.		lbs.	
1	Not cut	12-92	100	73-08	100
2	July 5	11-90	92	61-58	84
3	July 15	11-23	87	54-67	75
4	July 26	11-25	87	51-33	74
5	August 4	11-15	86	43-67	60

Taking the three years together, Table XII. shows that cutting back Champion oats has had only a very slightly depressing effect on the grain yields, even when this operation has taken place as late as the month of

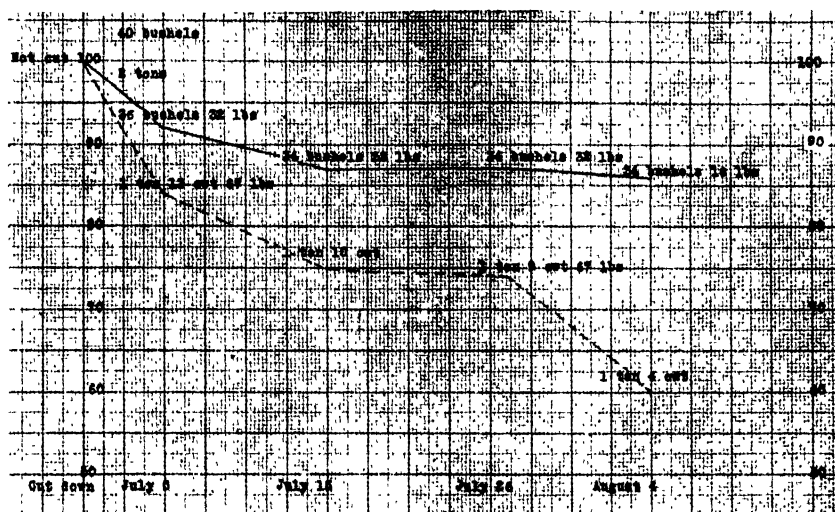


Fig 3 Showing Average Yields (1908-10) for Champion Oats cut down in various stages of growth

August. The total produce, or hay yields, have, on the other hand, been reduced rather considerably. The average results of Table XII. are given graphic illustration in Fig. 3 on the lines already adopted for Cape oats in Fig. 2.

ALGERIAN OATS.

Algerian oats are well known in this State for their relative hardiness under droughty conditions of climate. In the three seasons of these experiments the average number of days between germination and full bloom was 163 for Algerian oats, and between full bloom and the ripening of the grain 29. This represents a period of 192 days for full development, making Algerian oats slightly later than Champion oats.

TABLE XIII.—*Showing 1908 Data for Algerian Oats Cut in Various Stages of Growth.*

Seeding, April 21st ; Germination, May 6th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 13	November 13	4.75	18.00
2	July 8	October 19	November 15	11.50	33.25
3	July 16	October 20	November 16	12.50	33.00
4	July 24	October 21	November 18	10.25	35.25
5	August 3	October 21	November 19	9.75	27.50

There cannot be the slightest doubt but that in 1908 Algerian oats benefited very considerably from having been cut even as late as early in August, and improvement in general yields is shown both as grain and total produce or hay. Only one plot was cut down during frosty weather, viz., plot 4, and it does not appear to have suffered much from its effects. It seems probable that Algerian oats are more resistant to frosty conditions of weather than is apparently the case with Cape oats.

TABLE XIV.—*Showing 1909 Data for Algerian Oats Cut in Various Stages of Growth.*

Seeding, April 20th ; Germination, May 1st.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 19	November 19	23.00	96.00
2	June 21	October 21	November 22	30.00	112.00
3	June 30	October 23	November 24	32.00	109.00
4	July 15	October 23	November 27	21.00	78.00
5	July 23	October 26	November 29	23.00	80.00

Again, in 1909, cutting back Algerian oats had the effect of raising the yields both of grain and total produce, so long as the operation was carried out during the month of June. July cutting back had the effect of depressing the yields slightly.

TABLE XV.—*Showing 1910 Data for Algerian Oats Cut in Various Stages of Growth.*

Seeding, May 18th ; Germination, May 27th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	November 1	November 28	8.63	61.00
2	July 11	November 3	November 28	6.31	41.00
3	July 25	November 3	December 2	6.19	43.00
4	August 8	November 7	December 2	7.31	47.00
5	August 18	November 10	December 4	7.88	41.00

We have here a clear example of the influence of the time of the year when the crop is sown on the relative advantages of cutting down a crop of Algerian oats. In 1908 and 1909, when Algerian oats were sown in April, the plots

that had been cut down showed heavier yields, both in grain and hay, than the plot that had been left untouched. The reverse, however, proves to be the case in the present season, when the oats had been sown in the middle of May.

TABLE XVI. *Showing Average Results for Algerian Oats Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain. lbs.	Grain in terms of	Total Produce. lbs.	Total Produce in terms of
			Plot 1 taken as 100.		Plot 1 taken as 100.
1	Not cut	12.13	100	58.33	100
2	July 6	15.94	131	62.02	106
3	July 14	16.90	139	61.67	106
4	July 26	12.85	106	53.42	92
5	August 4	10.21	84	49.50	85

The average results of the three seasons summarised in Table XVI. show clearly that Algerian oats when sown at all early in the year benefit very considerably, both in grain and in total produce, if cut down or fed off with sheep even as late as the middle of July. These results are illustrated graphically in Fig. 4.

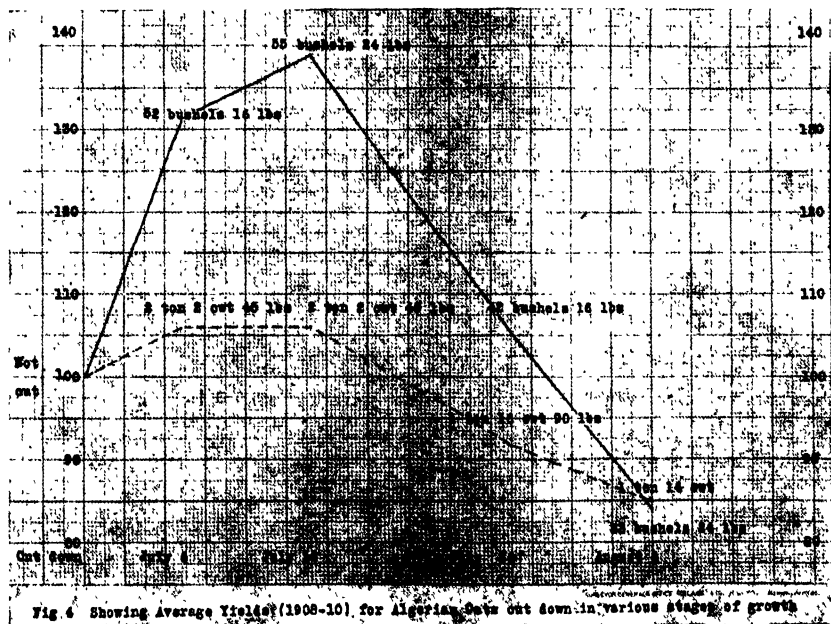


Fig. 4 Showing Average Yields (1908-10) for Algerian Oats cut down in various stages of growth.

CALCUTTA OATS.

This is a well-known oat, which we have generally found to succeed fairly well on the College farm. During the three seasons under consideration there extended between germination and full bloom an average of 160 days

for Calcutta oats, and between full bloom and the ripening of the grain an average of 33 days, representing, in the aggregate, an average of 193 days for the full growing period. In the point of view of growth, therefore, Calcutta oats are of the same order as Algerian oats.

TABLE XVII.—*Showing 1908 Data for Calcutta Oats Cut in Various Stages of Growth.*

Seeding, April 21st ; Germination, May 6th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 12	November 15	5.25	24.25
2	July 9	October 18	November 17	10.75	25.50
3	July 18	October 20	November 19	8.50	23.00
4	July 25	October 22	November 20	8.25	22.25
5	August 3	October 30	November 22	5.25	22.25

Like Algerian oats, Calcutta oats appear to have benefited in 1908 from having been cut down even as late as the end of July. The advantages of the practice were, however, more manifest in the grain yields than in the yields of total produce or hay.

TABLE XVIII.—*Showing 1909 Data for Calcutta Oats Cut Down in Various Stages of Growth.*

Seeding, April 20th ; Germination, May 2nd.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 19	November 19	32.00	126.00
2	June 21	October 21	November 22	30.00	111.00
3	June 30	October 24	November 23	29.00	100.00
4	July 15	October 26	November 27	15.00	67.00
5	July 23	October 29	November 29	14.00	66.00

In 1909 the position was reversed, so far as Calcutta oats were concerned ; the best yields, both in grain and total produce were secured from the plot that had not been touched, whilst the yields of the other plots diminished progressively in both lines with the time of the year at which they were cut down. Cutting down after mid-July resulted in 50 per cent. reduction in yield of both grain and total produce.

TABLE XIX.—*Showing 1910 Data for Calcutta Oats Cut in Various Stages of Growth.*

Seeding, May 18th ; Germination, May 28th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 29	December 1	7.63	42.00
2	July 11	October 29	December 1	9.63	48.00
3	July 25	November 2	December 4	13.56	57.00
4	August 8	November 6	December 4	7.06	41.00
5	August 18	November 6	December 4	2.56	25.00

In 1910, in spite of their late germination, Calcutta oats cut down towards the middle of July gave heavier yields, both of grain and total produce, than the plot which had not been touched. These results are somewhat unexpected, in view of the different behaviour of Algerian oats in the same year.

TABLE XX.—*Showing Average Results for Calcutta Oats Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of	Total Produce.	Total Produce in terms of
			Plot 1 taken as 100.		Plot 1 taken as 100.
		lbs.		lbs.	
1	Not cut	14·96	100	62·08	100
2	July 5	16·79	112	61·50	99
3	July 15	17·02	114	60·00	97
4	July 26	10·10	68	43·42	70
5	August 4	7·27	49	37·75	61

The average results of the three seasons show that Calcutta oats benefited in grain yields from having been cut down until about the middle of July; thereafter there was a marked reduction in yields. In the same way the

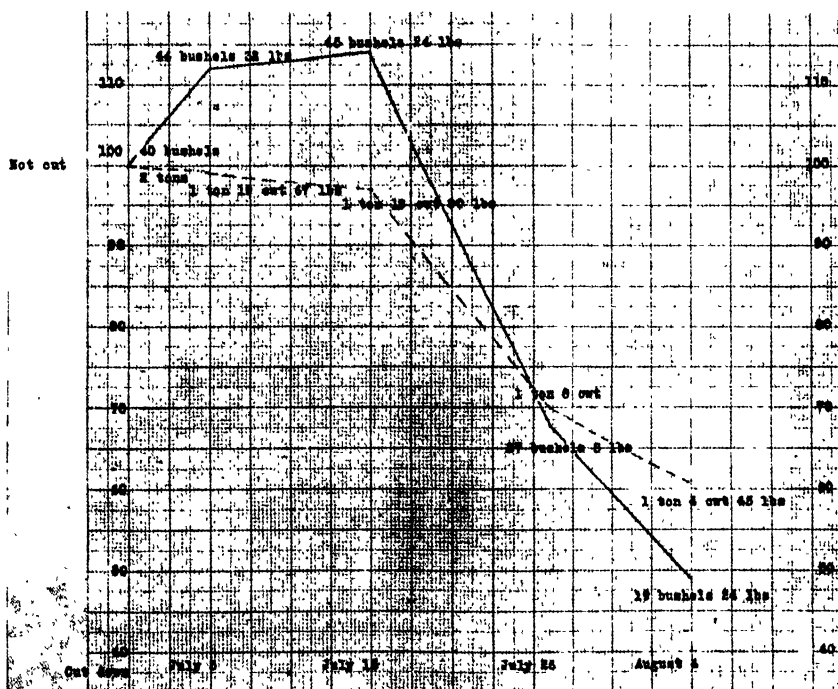


Fig 5 Showing Average Yields (1908-10) for Calcutta Oats cut down in various stages of growth.

hay yield was hardly affected by early cutting down, but showed considerable depression in any plot that had been cut down after mid-July. These average results of Table XX. are illustrated graphically in Fig. 5.

GARTON OATS.

This is a rather late oat that we have never grown at all extensively on the College farm. In the three seasons under consideration, between germination and full bloom, there averaged for Garton oats 176 days, and between full bloom and ripeness 27 days, making an aggregate growing period of 203 days. It should be remarked here that, as is the case with late wheats, the district is distinctly unfavorable to the later types of oats; they come into bloom late in the season, and the formation and ripening of the grain is forced into an undesirably short period of time by summer heat and drought.

TABLE XXI.—*Showing 1908 Data for Garton Oats Cut in Various Stages of Growth.*

Seeding, April 20th; Germination, May 4th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	November 3	November 27	3.00	35.00
2	June 29	November 6	November 30	4.50	22.50
3	July 7	November 8	December 1	2.25	20.00
4	July 20	November 12	December 6	2.25	27.50
5	July 31	November 13	December 8	3.00	32.50

It must be admitted that, so far as Garton oats are concerned, the 1908 results are not altogether concordant. Particularly is it remarkable that plot 5, cut down on July 31st, should yield more total produce than any of the other plots, with the exception of the plot that had not been touched. The grain yields, too, are somewhat erratic. These differences may possibly have arisen from some outside factor of which we omitted to take note at the time.

TABLE XXII.—*Showing 1909 Data for Garton Oats Cut in Various Stages of Growth.*

Seeding, April 20th; Germination, May 1st.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 24	November 25	20	120
2	June 11	October 26	November 29	13	94
3	June 25	October 28	December 20	7	53
4	July 9	October 31	December 24	7	48
5	July 23	November 6	December 28	9	56

The season 1909 proved frankly unfavorable to cutting down the crop in so far as Garton oats were concerned. It should be noted that cutting back the crop towards the latter end of July had the effect of throwing back the ripening of the grain fully a month. In unfavorable seasons this must prove a very serious disadvantage.

TABLE XXIII.—*Showing 1910 Data for Garton Oats Cut in Various Stages of Growth.*

Seeding, May 18th ; Germination, May 27th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	November 11	December 7	3.63	55
2	July 9	November 14	December 9	2.50	66
3	July 25	November 14	December 9	1.00	46
4	August 8	November 20	December 11	1.00	23
5	August 18	November 20	December 13	1.63	15

Again, in 1910, cutting down Garton oats was followed by marked depression in yields both of grain and hay, if we except the perhaps abnormal case of the total produce in plot 2. Late germination, followed up by late cutting

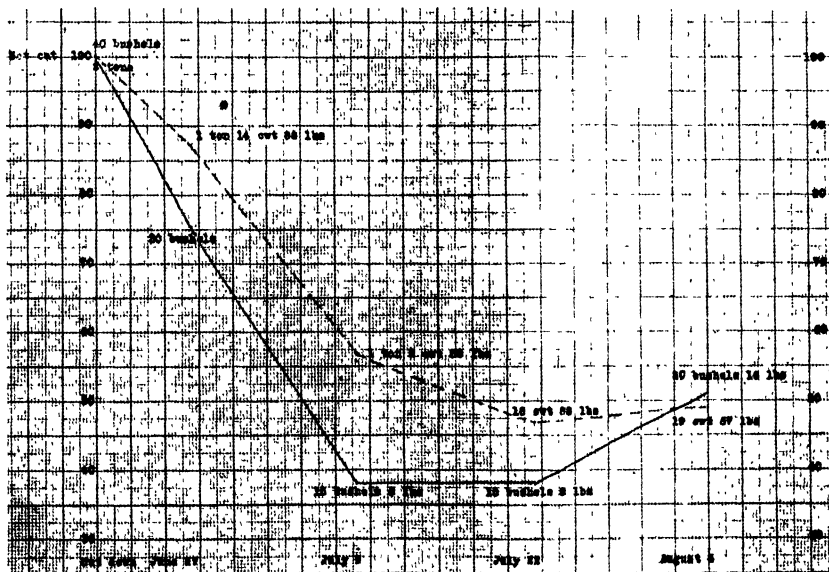


Fig 6 Showing Average Yields (1908-10) for Garton Oats cut down in various stages of growth

down of the crop, had the effect of reducing grain yields very considerably by preventing this late oat from carrying through its normal development before summer drought and heat were able to put a stop to any further development.

TABLE XXIV.—*Showing Average Results for Garton Oats Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Total Produce	
				in terms of Plot 1 taken as 100.	Plot 1 taken as 100.
		lbs.		lbs.	
1	Not cut	8.88	100	70.00	100
2	June 27	6.67	75	60.83	87
3	July 9	3.42	38	39.67	57
4	July 22	3.42	38	32.83	47
5	August 4	4.54	51	34.50	49

If we take the average results of the three seasons set out in Table XXIV., we see that cutting back the crop has had the effect of reducing the yields both as grain and as hay for Garton oats: and the depression in yields is very considerable, as we shall realise if we examine Fig. 6, in which these yields are given graphic representation.

CLYDESDALE OATS.

This is also a late oat which is new to us. In the three seasons of the experiments the average number of days between germination and full bloom proved to be 174, and between full bloom and ripening 30, giving a total aggregate growing period of 204 days; hence we may conclude that, in the matter of growth and general development, Clydesdale oats belong to the same class as Garton oats.

TABLE XXV.—*Showing 1908 Data for Clydesdale Oats Cut Down in Various Stages of Growth.*

Seeding, April 20th; Germination, May 4th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain.	Total Produce.
				lbs.	lbs.
1	Not cut	October 30	November 28	4.75	31.50
2	July 1	November 1	November 30	4.75	19.50
3	July 10	November 4	November 30	3.50	15.50
4	July 21	November 5	December 3	3.00	15.25
5	July 31	November 7	December 5	4.25	21.50

In 1908, Clydesdale oats did not benefit either in grain or in total produce from having been cut down. It will be noted that of the plots that were cut down, plot 5, cut latest of all on August 5th, was the one that yielded heaviest both in grain and total produce. Why this should be so is, of course, difficult to explain. It is, of course, best to look upon it as one of those anomalies inherent to all single season experiments, which become neutralised when averaged with the results of succeeding years.

TABLE XXVI.—*Showing 1909 Data for Clydesdale Oats Cut Down in Various Stages of Growth.*

Seeding, April 20th. Germination, May 1st.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 24	November 29	10	106
2	June 11	October 26	December 8	15	100
3	June 25	October 29	December 20	8	53
4	July 9	October 30	December 22	5	40
5	July 23	November 5	December 26	11	42

In 1909, cutting back of Clydesdale oats resulted in an increase of total grain when carried out as early as June 11th. This would appear to point to a certain degree of rankness in the crop at this time of the year. All other yields are lower than those of the untouched plot. Again we must note the anomaly of a heavier yield in the plot cut down last of all, on July 23rd.

TABLE XXVII. *Showing 1910 Data for Clydesdale Oats Cut Down in Various Stages of Growth.*

Seeding, May 18th ; Germination, May 27th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	November 11	December 5	6.25	63
2	July 9	November 11	December 8	4.25	43
3	July 25	November 12	December 8	4.25	35
4	August 8	November 14	December 11	3.44	31
5	August 18	November 21	December 13	1.06	14

In 1910, cutting back Clydesdale oats resulted in very uniform and regular depression of yields of both grain and total produce.

TABLE XXVIII.—*Showing Average Results for Clydesdale Oats Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Total Produce	
				Total Produce. lbs.	Plot 1 taken in terms of as 100.
1	Not cut	7.00	100	66.83	190
2	June 28	8.00	114	54.17	81
3	July 9	5.25	75	34.50	52
4	July 22	3.81	54	28.75	43
5	August 2	5.44	78	26.50	40

In the average of the three seasons, therefore, Clydesdale oats appear to have benefited in grain yield when cut back late in June. In all other

directions, however, the operation appears to have influenced unfavorably this late variety.

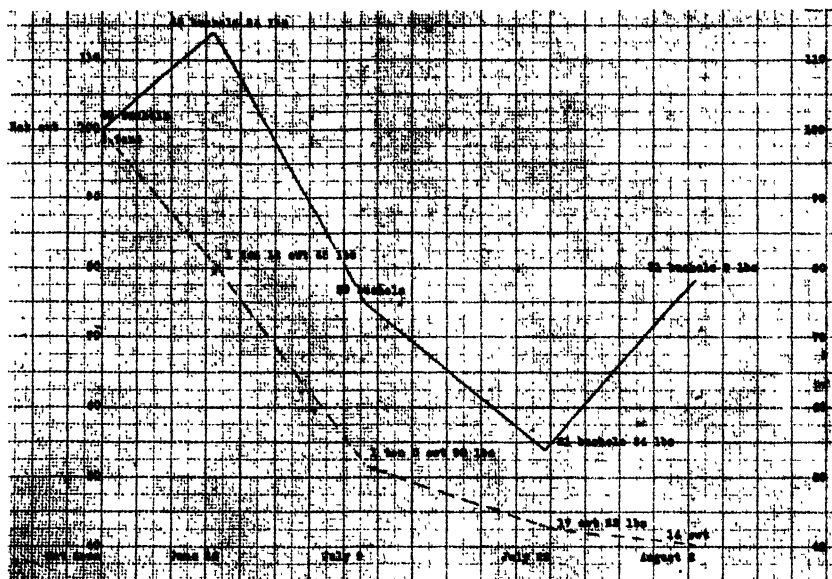


Fig 7 Showing Average Yields (1908-10) for Clydesdale Oats cut down in various stages of growth

OTHER VARIETIES OF OATS.

In addition to the six varieties of oats which we have now passed in review, in 1908 eight other varieties were similarly tested. For reasons already given these varieties were eliminated from the 1909 and 1910 tests, and it does not appear to us that any good purpose would be served by tabulating here the results recorded for a single season.

SUMMARISED CONCLUSIONS ON CUTTING DOWN OAT CROPS.

We now find ourselves in a position to summarise the results of these experiments with oats, and to point to whatever conclusions appear to us to be legitimately derived from them. Probably, however, these conclusions, more even than is usually the case in all forms of agricultural experimental work, must find their chief value and application in the district immediately surrounding us, and to a less degree in those others in which general ruling conditions are such as to lead to similarity of growth in oat crops. Indeed, cutting down an oat crop in its early stages of growth, or feeding it down with sheep, leads to results that vary so much from season to season in one and the same district, that we cannot hope for anything like concordant

results when we pass from one district to another. The utmost, therefore, that we can hope to do in this connection will be to disengage a few general principles, which in ordinary circumstances appear to sway the march of events.

THE INFLUENCE OF SEASON.

It will be as well in the first place to endeavor to determine what has been, in these experiments, the influence of "season" as distinct from that of

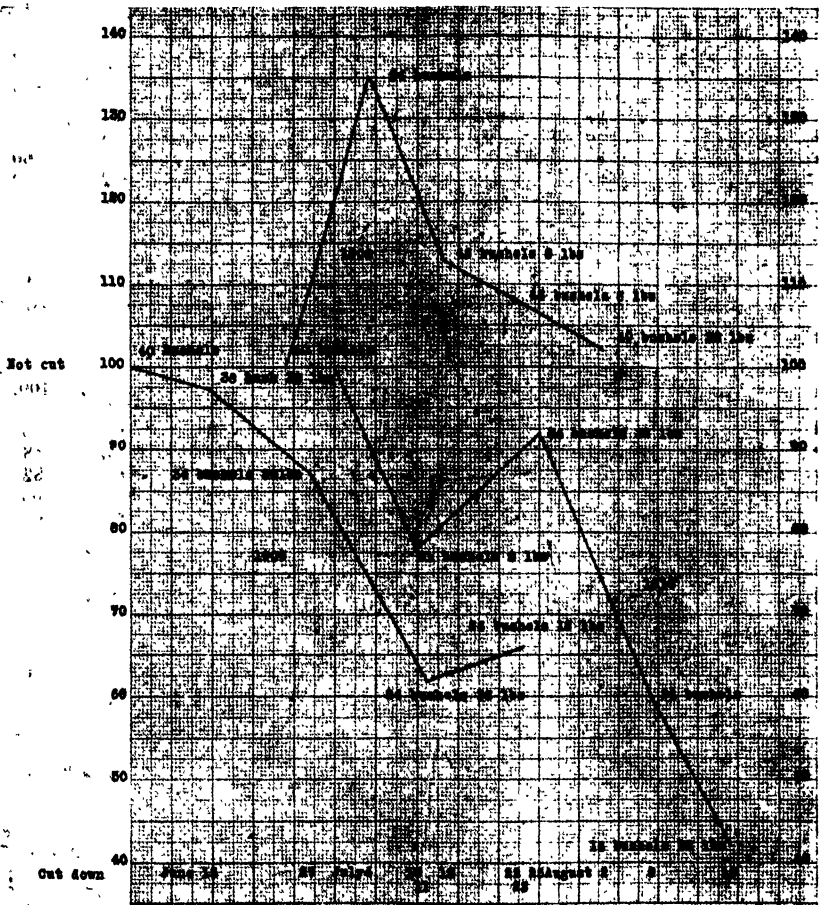


Fig 2. Showing Average Yields of Grain from six Varieties of Oats cut down in various stages of growth in 1908, 1909 and 1910 respectively.

“variety.” In this connection we have summarised below in Table XXIX. the average results for the six varieties of oats tested during the three years. We have also given these results graphic illustration in Figs. 8 and 9,

TABLE XXIX.—*Showing the Average Results in each Year of Cutting Down Six Varieties of Oats in Various Stages of Growth (1908-10).*

1908.			1909.			1910.		
Seeding April 20-21.			April 20-21.			May 18.		
Germination ... May 4-6.			May 1-6.			May 27-28.		
GRAIN YIELDS.								
Average date of cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Average date of cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Average date of cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.
	lbs.			lbs.			lbs.	
Not cut	5.67	100	Not cut	22.50	100	Not cut	7.68	100
July 4	7.71	135	June 15	21.83	97	July 10	6.01	78
" 13	6.42	113	" 27	19.50	87	" 25	7.08	92
" 22	6.13	108	July 11	14.00	62	Aug. 8	4.60	60
Aug. 2	5.83	102	" 23	14.83	66	" 18	3.22	42
TOTAL PRODUCE YIELDS.								
Average date of cutting.	Total Produce.	Total Produce in terms of Plot 1 taken as 100.	Average date of cutting.	Total Produce.	Total Produce in terms of Plot 1 taken as 100.	Average date of cutting.	Total Produce.	Total Produce in terms of Plot 1 taken as 100.
	lbs.			lbs.			lbs.	
Not cut	28.13	100	Not cut	106.50	100	Not cut	56.50	100
July 4	24.42	87	June 15	99.33	93	July 10	49.67	88
" 13	21.29	76	" 27	76.17	72	" 25	46.50	82
" 22	21.71	77	July 11	59.00	55	Aug. 8	36.50	65
Aug. 2	22.87	81	" 23	57.17	54	" 18	24.00	42

We note, therefore, from Table XXIX. and the accompanying graphic illustrations, (1) that in all three years the total produce, or hay yields, of the oat crops were adversely affected by the cutting down of the crop in the early stages of growth; and (2) that, whilst in 1908 the average grain yields showed improvement all along the line where the crop had been cut down, the same operation had, both in 1909 and 1910, a markedly depressing influence on all oats crops that had been cut down.

It should be remarked here that whilst in 1908 and 1909 seeding operations took place early in the year, so that crops showed above ground in the first days of May, the tardy autumn rains of 1910 kept back seeding operations of that year until past the middle of May, and sown crops became visible only towards the end of that month. And since from everyday experience we may assume that a certain degree of early winter rankness is more or less essential to the success of the feeding off of a crop, and that early sowing accompanied by early germination are factors frequently leading to this type of rankness, we may conclude that in this connection both the 1908

and the 1909 experiments were given a far more favorable start than those of 1910. And it is because of this that it was not found possible to cut down the 1910 plots until the middle of July, and that the last plot was cut towards the middle of August. These facts alone will suffice to explain why the grain yields of oat crops cut down in 1910 were so much below the yields of crops that had not been touched. In practice we should say that the crops did not in that year stand in any particular need of feeding off.

On the other hand, however, it is more difficult to reconcile the success of the operation in 1908 with its failure in 1909. In both seasons the experiments were given an equally favorable early start; both seasons from the general point of view were very favorable to the strong, vigorous growth of all

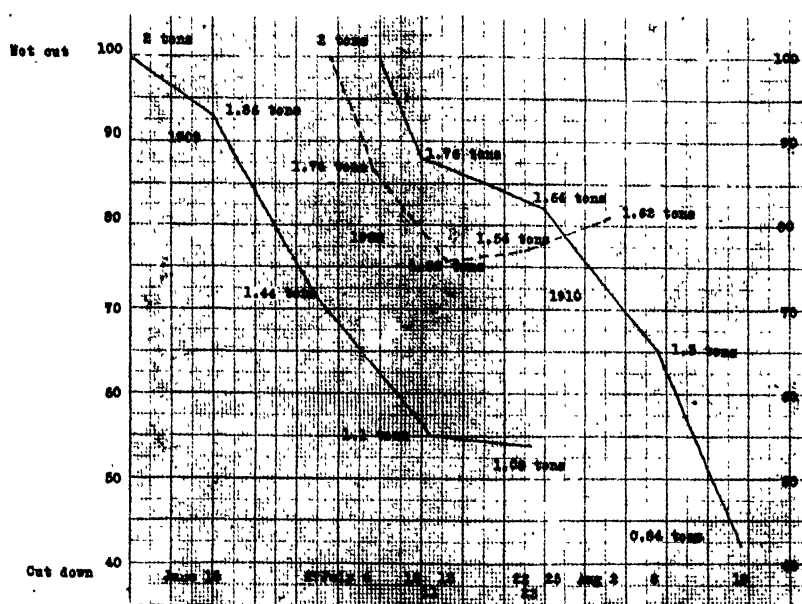


Fig 9 Showing Average Total Produce Yields from six Varieties of Oats cut down in various stages of growth in 1908, 1909 and 1910.

cereal crops. Indeed, of the two seasons, 1909 would appear to have been in this connection the more favorable, for in 1909 frosts were less frequent and less intense; and both winter and spring rains were slightly heavier than those of the preceding year. In addition to this, it should be noted that the plots became available for cutting down earlier in 1909, the last plot being cut about one week before the end of July. In spite of these facts, the average results of cutting down a crop of oats were favorable to the grain yields in 1908 and unfavorable to them in 1909. If, in this connection,

we compare the relation of straw to grain in the plots that had not been cut down, as a measure of the relative rankness of growth of the crops in the respective years, we find it to be represented by 158lbs. of straw to 40lbs. of grain in 1908, when the grain yields were favorably affected by cutting down, and 149lbs. of straw in 1909, when grain yields were depressed by the same operation. It would seem, therefore, that there must have been in the two seasons conditions which escape us and which were responsible for these divergent results.

CONCLUSIONS BEARING ON GENERAL PRACTICE.

What conclusions, then, may legitimately be drawn that can have some direct bearing on general practice? Feeding off a crop with sheep can take place with advantage only in the early stages of growth of a crop, in the months of June or July, according to districts and seasons; that is to say, at a time of year when we can do no more than guess at what is ultimately likely to be the character of the season. It is possible that later on features may develop that may lead to enhanced grain yields in crops that have been fed down. This was the case with us in 1905. In the great majority of cases, however, it is fairly evident that the reverse will be the case, and that in ordinary circumstances we cannot hope to both have and eat our cake at one and the same time. It follows, therefore, that if we have any regard for our grain yields, it is exceedingly unwise to feed off a crop of oats with sheep, except we find ourselves confronted with exceedingly urgent reasons why this practice should be followed. And the only cogently urgent reason that we know of is undue rankness in the crop, the consequence of early seeding and mild, moist, winter conditions. Such a crop is exposed to being lodged by rough weather and to being blighted off by hot winds. In the circumstances it is permissible to feed it off rapidly with sheep.

HOW LATE IN THE SEASON IS IT SAFE TO FEED OFF A CROP OF OATS?

This, no doubt, is a question the answer to which must vary within wide limits from district to district, and our answer can hold good for no more than the district in which we are placed. It must be evident, too, that even within the same district the period of safe feeding off will vary with seasonal conditions. Thus, in seasons of copious spring rains it is possible to feed off with safety far later in the year than is the case when the spring is hot and dry. Unfortunately, in everyday practice we cannot take advantage of this occasional margin of safety, since we are never in a position to foretell how any given season is likely to close up. In ordinary practice, therefore, when feeding off has been recognised as necessary, we are bound to confine ourselves

to what are recognised as the average normal conditions of the district ; and even then we must guard ourselves against possible unfavorable contingencies by remaining well within the recognised line of safety. As helping to throw a certain amount of light on this question we have summarised below in Table XXX. the average results from the six varieties of oats tested

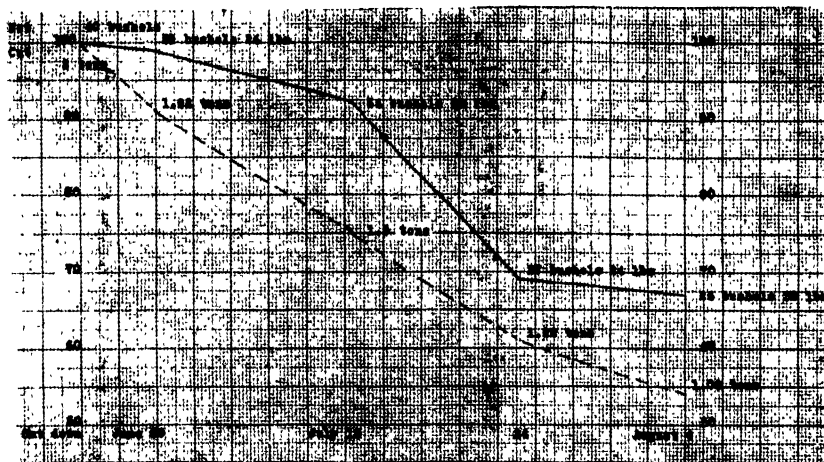


Fig 10 Showing combined Average Yields of Six Varieties of Oats cut down in various stages of growth from 1908 to 1910.

in the three years of the experiments, and we have given these results graphic illustration in Fig. 10.

TABLE XXX. - Showing Average Results for Six Varieties of Oats Cut Down in Various Stages of Growth (1908-10).

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.		Total Produce in terms of Plot 1 taken as 100.	
		lbs.		lbs.		
1	Not cut	11·95	100	63·71		100
2	June 30	11·85	99	57·81		91
3	July 13	11·00	92	47·99		75
4	July 24	8·24	69	39·07		61
5	August 4	7·96	67	34·68		54

It will be noticed from the figures of Table XXX. and the diagram in Fig. 10 how rapid is the decline in yields of oat crops fed off after the first fortnight in July. Thus, if we assume the crop that had not been cut down to have yielded 40bush. to the acre, a crop fed down on the 13th of July would have

declined to 36bush. 32lbs., and one fed down on July 24th to 27bush. 24lbs. The fall in the total produce or hay yields are even more pronounced and rapid. Nor in this connection should it be forgotten that each one of the three seasons for which these figures represent general averages, were on the whole favorable to feeding off with sheep, in that they were years in which both winter and spring rains were copious, indeed much above our normal average figures ; and we may infer that under more adverse conditions of weather the decline

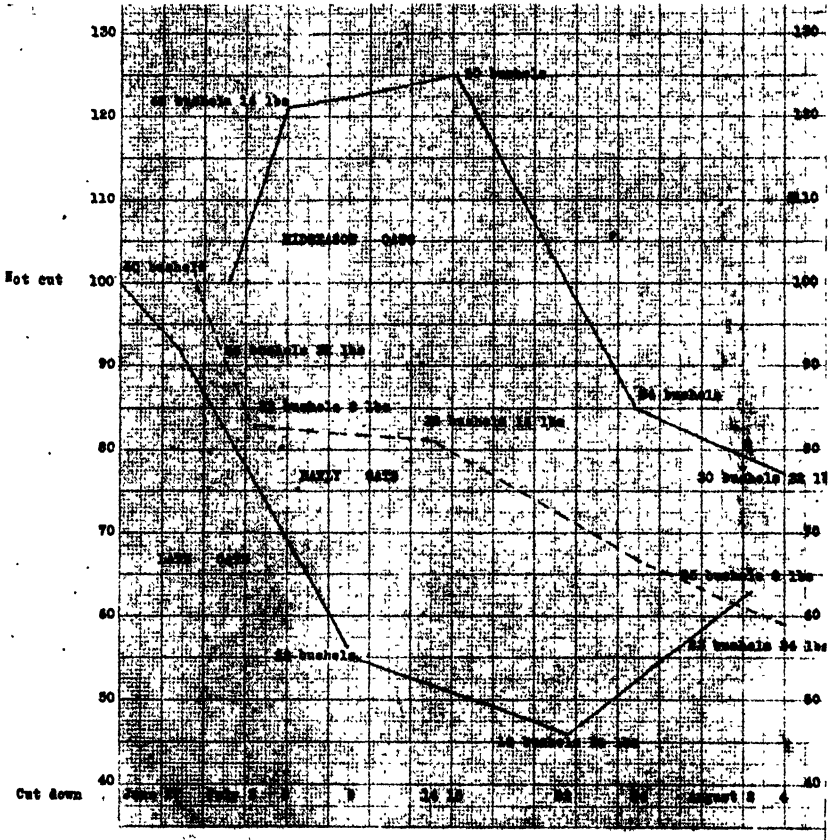


Fig 11 Showing Average Grain Yields (1906-10) for Early, Midseason and Late Cuts cut down in various stages of growth.

in yields resulting from late cutting down would have been even more pronounced. We conclude, therefore, that in the Roseworthy district the farmer who feeds off his crop after the first week in July is running grave risks in the matter of both grain and hay yields, and that this treatment is likely to prove successful only in very exceptional seasons, the general character of which nobody is in a position to foretell at that time of the year when crops

need feeding off. We cannot pretend to extend these limitations to districts that are differently situated. In this connection each district must determine what can be considered wise and what unwise practice.

INFLUENCE OF "VARIETY."

In the earlier pages of this report we have shown that some varieties of oats appear to respond better to cutting down than others. And here again we suspect that the compelling influence of district must be taken into consideration, for it does not follow that varieties of oats that can be fed off with impunity, and even with advantage, in this district, can be similarly treated in others; hence we do not claim for remarks made under this

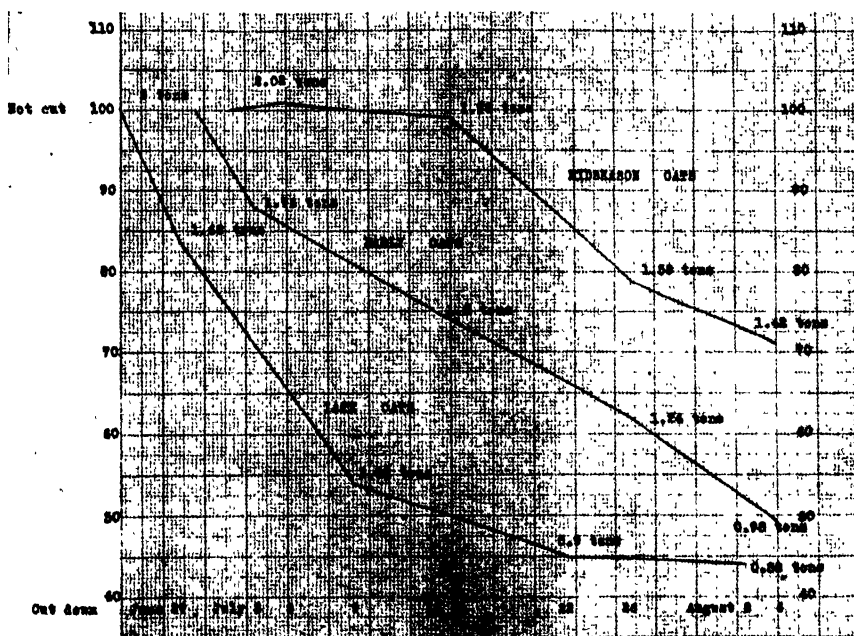


Fig 12 Showing Average Total Product Yields (1908-10) for Early, Midseason and Late Oats cut down in various stages of growth.

heading anything more than a purely local bearing. Reference to Tables VIII., XII., XVI., XX., XXIV., and XXVIII. show cutting down to have proved advantageous in the case of Algerian and Calcutta oats and unfavorable in the case of Cape, Champion, Garton, and Clydesdale oats. It would appear, therefore, that the practice proved favorable to mid-season varieties and unfavorable to early and late varieties. These results are summarised below in Table XXXI., and given graphic illustration in Figs. 11 and 12.

TABLE XXXI.—*Showing Average Results from Early, Mid-Season, and Late Varieties of Oats Cut Down in Various Stages of Growth (1908-1910).*

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Total Produce.	Total Produce in terms of Plot 1 taken as 100.
		lbs.		lbs.	
EARLY VARIETIES (Cape and Champion Oats).					
1	Not cut	14.37	100	61.50	100
2	July 3	11.86	83	54.13	88
3	July 14	11.71	81	46.05	75
4	July 26	9.64	67	38.00	62
5	August 4	8.49	59	30.25	49
MID-SEASON VARIETIES (Algerian and Calcutta Oats).					
1	Not cut	13.55	100	61.21	100
2	July 5	16.37	121	61.79	101
3	July 15	16.96	125	60.84	99
4	July 26	11.48	85	48.42	79
5	August 4	10.41	77	43.62	71
LATE VARIETIES (Garton and Clydesdale Oats).					
1	Not cut	7.94	100	68.42	100
2	June 27	7.33	92	57.50	84
3	July 9	4.34	55	37.09	54
4	July 22	3.62	46	30.79	45
5	August 3	4.99	63	30.17	44

(To be continued.)



A HARVEST FIELD.

SPEECH DAY AT ROSEWORTHY.

ANNUAL DISTRIBUTION OF PRIZES.

There was a large gathering at Roseworthy College on Friday, March 14th, the occasion being the annual Speech Day and distribution of prizes. The visitors present included the Minister of Agriculture (Hon. T. Pascoe, M.L.C.) and Mrs. Pascoe, the Director of Agriculture (Mr. Wm. Lowrie, M.A., B.Sc.), the Hon. W. Hannaford, M.L.C., Mr. S. B. Rudall, M.P., and the following members of the Advisory Board of Agriculture :- Messrs. A. M. Dawkins (Chairman), G. F. Cleland, J. Miller, C. J. Tuckwell, and C. J. Valentine.

THE PRINCIPAL'S REPORT.

The Principal of the College (Professor Perkins), in presenting his report, said "To-day brings to a close the 28th scholastic year of the Roseworthy Agricultural College, and is the ninth occasion on which I have had the pleasure of submitting the Principal's report for the year. The season, which is now struggling to an end, has in many respects been a remarkable one. It will be within the recollection of many how gloomily it opened; and to the end of July the agricultural prospects of the great bulk of our settled areas were blacker than I have ever known them in my 20 years' experience of this country. We lived on hope in those days, and, as it proved, not in vain. Eventually the dry, inclement weather gave way to a wonderful spring and early summer; and had it not been for a temporary lull in favorable conditions in the month of October, we should have had to our credit yet another record season, wherever an unfavorable winter had not led to more or less complete malting of sown crops or to an over-abundance of weeds. Ultimately, indeed, almost throughout the State harvest results have proved very favorable, and I am glad to be able to say that the College farm has shared in this general prosperity. I do not feel called upon here to give particulars of our harvest returns, since full publicity has been given them in reports that have already been issued. There are, however, one or two matters of general interest to which I should like to make reference before passing on to the chief business of to-day's function.

"I wish, in the first place, and by no means for the first time, to draw attention to the absurd inadequacy of our water supply from the point of view of irrigation. This supply is drawn from a magnificent sheet of water,

way back in the hills, the contents of which are no more than broached by the ordinary requirements of the district; and yet in the summer months, when irrigation demands are most pressing, we can barely secure sufficient water to keep a few patches of lucerne going. I am not now raising this question from the point of view of our ordinary farm requirements. I am viewing it, I hope, from a wider-ranged and more important outlook. I suppose that there is nobody who doubts that as our population increases the successful expansion of our agricultural industries must rest very largely on the extent to which we are able to take up irrigation seriously. And if we hope ever to find regular employment for a sedentary rural population, the time must come when we shall look not only to the River Murray or irrigation settlements, but when we shall scour the hills for suitable catchment areas; and when to neglect to catch and store up any water that reaches us from the heavens will be classed among the delinquencies of the criminally negligent. But before days like these can dawn, we must, as a people, have learnt how to use water to best advantage, we must have acquired the irrigation instinct; an instinct, I might add, peculiarly developed in the Latin and Semitic races, but foreign as yet to the British character. In present circumstances, we are accustomed as farmers to handle more or less roughly vast areas of land, and it is not the empirical experience of one or two generations that is going to teach us the art of handling to best advantage those small areas of land that are alone consistent with irrigation. In my view—possibly a mistaken one—enlightened statesmanship should in this matter take time by the forelock, and in anticipation of foreseen economic changes, make provision for the building up of local irrigation art. Here, at the College, we do no more than play with irrigation at the present time; give us a water supply adequate to the purpose, and we can guarantee to set about laying the foundations of local irrigation art; and by that very fact save to others many painful struggles with unfamiliar conditions. We could set on foot inquiries into those hundreds of problems that are troubling irrigationists all the world over. To name only a few, we could undertake to determine accurately the most profitable methods of applying water under conditions obtaining in ordinary practice; how to control and overcome the rise of salt, a phenomenon inseparable from all forms of irrigation under climatic conditions such as ours; what is the connection between the under drainage and irrigation; what are the exact quantities of water required for the growing of different kinds of crops; what crops can be irrigated to the best advantage, and how to grow them, &c. I submit that the Roseworthy Agricultural College is peculiarly well situated for work of this kind; we have both the laboratories and the trained staff essential to experimental work; we have shown evidence that we are not wanting in the organising powers and patience that are equally essential; the fact, too, that the water would be supplied to us from a main instead of from a bore or a river is an additional advantage

on the side of experimental work, since by means of meters every gallon of water used in the course of experimental irrigation could be accounted for.

“The stock objection to proposals of this kind is that irrigation at 6d. a thousand gallons cannot pay; this bare fact may be granted readily enough, but it has little or nothing to do with experimental work, the results of which should be of considerable use to those who are fortunate enough to have the use of cheaper water. The actual price of the water will not influence in the slightest degree the value of the experimental work done; it will represent no more than a bookkeeping accommodation between two Government departments.

“Finally, let us not lose sight of the fact that were irrigation to be carried on here on anything like an adequate scale, the College would offer a training ground for the future irrigationists of the State. And I am inclined to believe that in the course of time no Australian agricultural college will be reckoned fully equipped unless it offers ample facilities for the training of its students in irrigation methods.

“It has been suggested from time to time that as an institution we might do something towards helping in the training of country school teachers, and on this subject I had some correspondence with the late Director of Education, whose untimely end we all deplore. Indeed, towards the end of last year we may be said to have come to a definite arrangement in the matter. I am unable to say whether the plan agreed upon is likely to find favor with Mr. Williams's successors. In substance the plan was that students of the Training College who had qualified in science subjects at the University should subsequently spend 12 months at Roseworthy. Here they would attend all lectures and demonstrations bearing on purely technical subjects, such as general agriculture, dairying, fruit culture, &c. These students would not be expected to take part in ordinary farm work, nor would we be expected to make farmers of them. The fundamental idea in the whole proposal is that country school teachers should be given an opportunity of acquiring an accurate insight into the rural operations which their pupils might be expected to take up in after life, and in this manner help to render their teaching work both more interesting and more helpful to country lads. Both Mr. Williams and I were agreed that the plan which would bring to the College in the few weeks of recess time a number of State school teachers would be unfair to the College staff, and of no more than spectacular value to the teachers themselves. Personally, I think well of our joint scheme, so long as the College accommodation holds out; and, should it ever be put in hand, I am prepared to do all in my power to make a success of it.

“In a review of the successes achieved last year I may be allowed to draw attention to our achievements at the September Show of the Royal Agricultural Society, in competition with breeders of the whole State. We secured

20 prizes for livestock exhibits, including three champion prizes, represented in the aggregate by a silver cup, two silver medals, and £19 of prize money. At the recent Autumn Show of the same society we were competitors for the first time, and were awarded in the cereal exhibits four prizes, including a silver medal.

" I shall now turn to the successes achieved by students of the third year. It affords me great pleasure to state that the outside examiners have spoken to me in the highest terms of these students taken as a class ; and in many directions, indeed, they have succeeded in establishing new records for our registers. I must, in the first place, congratulate most heartily the gold medallist, Mr. C. F. Stephens. His general diploma average of 90 per cent. is the highest ever secured at the institution, and he has taken honors in every subject but one ; in addition, he has won every class prize it was possible for him to win ; and, finally, he has been recommended for the John Ridley Memorial Scholarship, entitling him to £80 per annum for two years if he elects to continue his studies at the University. I have no hesitation in stating that by his general conduct, his assiduous attention to his duties and outside work, Mr. Stephens has proved himself one of the best students that have ever been through the institution.

" Adverting now to third-year students as a whole, I must state that this is the first time that five diplomas of the first class have been awarded in one year ; the highest number previously awarded was three in 1910. The five successful students—Messrs. Stephens, Driscoll, Cowell, Scott, and Hester—are to be congratulated on their work. Finally, this is the first time that 17 students have been awarded the College diploma in one year. The general diploma average for the whole class—70·2—although not the highest on our records, is very satisfactory.

" And now, before I take my seat, let me say to those who are about to leave us, that I wish you, one and all, every success in your future careers. You know that there are greater prizes than these to be won beyond these walls, and the eyes of ambitious youth turn naturally towards them. Strive for legitimate prizes by all means ; and, given health and strength, what you ardently desire you can attain to if you bring to the task courage and perseverance enough. I would like you to remember, however, that the winning of wealth, of power, of renown—the outside prizes, in fact—cannot with impunity be made the sole object of life. You may attain to them all, and yet miss the one essential, and that is happiness ; and life is nothing without it. Do your duty ; love uprightness ; avoid what is evil ; fight manfully and fairly ; be generous ; let your consciences approve of your deeds ; and wealthy or poor, successful or unsuccessful, you will at least earn self-approval and happiness ; and that is what from the bottom of my heart I wish you all."

THE PRIZE LIST.

The prize list was as follows :—

DIPLOMA LIST (IN ORDER OF MERIT).

Diplomas of the First Class.

Cyril Forster Stephens, with honors in agriculture, viticulture, oenology, fruit culture, dairying, veterinary science, chemistry, surveying, aviculture, and wool-classing.

Wilfred Driscoll, with honors in agriculture, bookkeeping, surveying, aviculture, and wool-classing.

Roy Charles Cowell, with honors in chemistry { Equal.

Robert Colin Scott, with honors in agriculture {

Lancelot Hallett Sweeting Hester, with honors in bookkeeping and aviculture

Diplomas of the Second Class.

Gerald Earnshaw Roberts.

Hugh Gilmore Cumming, with honors in chemistry.

Keith Elliott Neville, with honors in aviculture.

Bruce Lancelot Hocking.

George Vernon Madeley.

Leslie Gow Morrison, with honors in aviculture.

Alfred Horace Howard.

Frank Fisher Beard, with honors in aviculture.

Hugh Clifford Catt.

Diplomas of the Third Class.

John Leadbetter Thomson.

Arthur Carew Simpson.

James Charles Virgil Martin.

THIRD YEAR STUDENTS.

Gold medal (presented by the Royal Agricultural and Horticultural Society for highest aggregate in all diploma subjects), Cyril Forster Stephens.

College second prize, Wilfred Driscoll.

Old Student's Cup (presented by the Old Students' Association for highest aggregate in agriculture and veterinary science), Cyril Forster Stephens.

Oenology prize (presented by Professor Perkins), Cyril Forster Stephens.

Fruit culture prize (presented by the Albert Molineux Memorial Trust), Cyril Forster Stephens.

Viticulture prize (presented by Mr. H. E. Laffer), Cyril Forster Stephens.

Chemistry prize (presented by Mr. J. H. Phillipp, B.Sc.), Cyril Forster Stephens.

College prize for best outside work, Cyril Forster Stephens.

Special prize (presented by members of the Advisory Board of Agriculture for highest aggregate in all practical examinations), Cyril Forster Stephens.

SECOND YEAR STUDENTS.

Silver medal (presented by Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S., Henry Arthur Follett.

College second prize, Leslie James Clark.

Special prize (presented by members of the Advisory Board of Agriculture for highest aggregate in all practical examinations), Geoffrey Koepfen Henderson.

Agriculture and Farm Diaries (prize presented by Professor Perkins), Leslie James Clark.

Fruit culture prize (presented by Mr. H. E. Laffer), Henry Arthur Follett.

Viticulture prize (presented by H. Buring, Esq.), Leslie James Clark.

College prize for best outside work, Henry Arthur Follett

FIRST YEAR STUDENTS.

Silver medal (presented by A. L. Brunkhorst, Esq.), Franz Oscar Henry Martin.

College second prize, George Robert Harrison.

Agriculture and Farm Diaries (prize presented by Professor Perkins), Francis Henry Hugh Dealy.

Bookkeeping prize (presented by Mr. H. C. Pritchard), Robert Angus Keddle.

Botany prize (presented by Mr. A. J. Adams), Francis Henry Hugh Dealy.

English prize (presented by Mr. A. J. Adams), Francis Henry Hugh Dealy.

College prize for best outside work, Stewart Bruce Opie.

THE SPEECHES.

The Minister of Agriculture, in the course of an interesting speech, congratulated the Principal, the various members of the staff, and the students on having had a successful year. Proceeding, he said he had heard it stated that Roseworthy College stood at the top of the tree among agricultural institutions in Australia. One thing he was certain about was that while visitors from all parts of the world credited the South Australian farmers with being the leading agriculturists in the Commonwealth, the farming here undoubtedly owed a great deal to the influence of the College. Attending conferences of the Agricultural Bureau in the different rural centres he had been struck by the fact that in nearly every instance the men who took the lead were old Roseworthy students. The students of the past had accomplished much, but he expected those of to-day to accomplish still greater things. He congratulated the gold medallist the more heartily, too, because he knew that he had been obliged to exercise considerable self-denial in order to attend the College and educate himself in the science of agriculture. All honor to him. Personally he had no doubt that a young man who could do that would be an immense success in life. They expected great things of the 1912-13 gold medallist, and wished him and all the students a very happy and successful future.

The Hon. W. Hannaford, M.L.C., Mr. S. B. Rudall, M.P., Prof. Lowrie, and Mr. A. M. Dawkins also addressed the gathering, after which Mrs. Pascoe distributed the prizes.



"Blue Ribbon of Turretfield."

ANALYSES OF FERTILISERS.

The following table gives the results of the analyses made by the Government Analyst (Mr. W. A. Hargreaves, M.A.) of samples of fertilisers taken by the inspectors under the Fertilisers Act since the beginning of the year 1913:—

Name.	Phosphate.				Nitrogen.				Potash.	
	Water Soluble.		Citrate Soluble.		Acid Soluble.		Result of Analysis.		Result of Analysis.	
	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.
Adelaide Chemical & Fertiliser Co., Ltd.—										
Concentrated super. ex <i>Hessen</i>	77.63	—	12.04	—	4.48	—	—	—	52.14	52.00
Sulphate of potash ex <i>Annaberg</i>	—	—	—	—	—	—	—	—	—	—
Guano super.	28.02	27.00	5.99	3.00	4.12	6.00	—	—	—	—
S.A. super.	33.92	33.00	—	—	—	—	—	—	—	—
Mineral super.	38.85	36.00	—	—	—	—	—	—	—	—
Bagot, Shakes, & Lewis, Ltd.—										
Japanese super. ex <i>Luzon Maru</i>	38.05	38.00	—	—	—	—	—	—	—	—
"	42.66	42.00	—	—	—	—	—	—	—	—
Bel & Co., James—										
Nitrate of lime ex <i>Albany</i>	—	—	—	—	—	—	12.80	12.75	—	—
Sulphate of potash ex <i>Annaberg</i>	—	—	—	—	—	—	—	—	52.36	52.00
Elder, Smith, & Co., Ltd.—										
Lawe's super. ex <i>Neuilly</i>	37.91	36.00	—	—	—	—	—	—	—	—
Hackett, E. & W.—										
Sulphate of potash ex <i>Osnabruck</i>	—	—	—	—	—	—	—	—	52.03	51.00
Hasell, A. H.—										
Sulphate of potash ex <i>Scheublen</i>	—	—	—	—	—	—	—	—	53.75	51.00
Mount Lyell Mining & Rly. Co., Ltd.—										
Thomas phosphate ex <i>Schelenen</i>	—	—	18.90	15.00	15.70	20.00	—	—	—	—
Adelaide super.	30.49	30.00	—	—	—	—	—	—	53.49	52.00
Sulphate of potash ex <i>Annaberg</i>	—	—	—	—	—	—	—	—	—	—

GEO. QUINN, Inspector of Fertilisers.

APPLE EXPORT.

REPORT FROM TRADE COMMISSIONER.

The following report, dated London, January 10th, has been received by the Minister from the Trade Commissioner :—

“ I believe that, as regards quantity, 1912 was a record year for South Australian apple shipments ; it certainly was a record in regard to quality.

“ I have already written so much on the subject of grading, packing, &c. that it is hardly worth while again, referring in detail to these all-important points. At the same time I should like to again draw attention to the fact that to ship to England and the Continent immature and unsuitable fruit is a great disadvantage to the growers in South Australia. By ‘ unsuitable ’ fruit I mean varieties it will never pay to ship to this market because of the low prices obtainable for them. I think it would not be exaggerating to say that at least one-quarter of the whole of the fruit shipped from South Australia to England last year never ought to have left the State. I base this calculation on the quantity of fruit which I myself handled, and of what I also saw of consignments to other firms.

“ The fact that a grower ships the class of fruit to which I refer recoils upon him in more than one way. First of all, in many instances the fruit does not realise on this market a sufficient price to cover the out-of-pocket expenses, and the grower would therefore have done better had he let the fruit rot on his premises. Then again, in addition to actual loss, the prices for the fair average quality fruit are materially affected, and the returns generally are reduced by the large quantities of this inferior fruit coming on to the market, and the prices for the good fruit are also adversely affected.

“ Immature fruit may appear to be all right at time of shipment ; but, as all growers know, it will, after being in store for some time, become shrivelled and wasty on coming into contact with the atmosphere here, with the result that many of the cases are very slack.

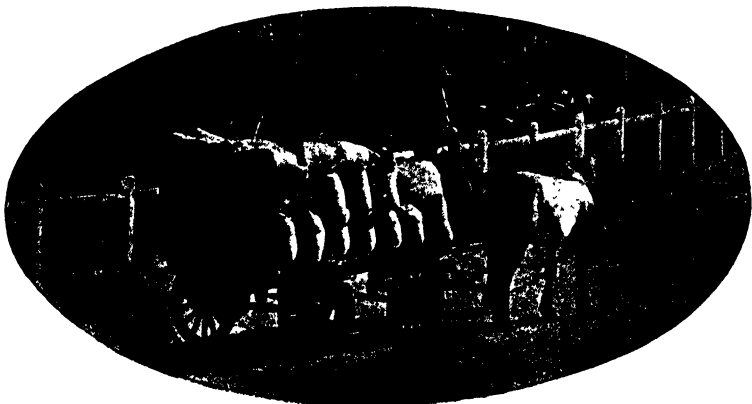
“ Among the most suitable varieties of apples for this market are the following :—Cox’s Orange Pippins, Cleopatras, Jonathans, Dunn Seedlings, Rome Beauties, Wellingtons, Stone Pippins, Spitzenburg. Each season, however, some new variety which has never been heard of in this country is shipped, and naturally buyers are shy of dealing in them.

"From my experience of selling fruit here I should say it would be better to eliminate from export altogether such varieties as Gravenstein, Ben Davis, Nickajacks, Hoover, Shepherd's Perfection, and similar kinds, as the majority of them are very bad carriers, and none of them is liked on this market.

"With this in view, the question may be asked 'What is to be done with these varieties if they cannot be shipped?' The most practicable suggestion I can make is - drying. I have made exhaustive inquiries as to the possibility of a market for dried fruit of this kind in this country and on the Continent, and I should say the normal price, over a series of years, should be from 30s. to 35s. per cwt., landed terms, London. The apples should be cut in rings, evaporated, and packed in $\frac{1}{2}$ cwt. boxes. If it is possible for the fruit to retain a nice white color without, I would suggest omitting sulphuring; but it is essential that the fruit should be a nice white color.

"As I am not in a position to ascertain exactly the cost of carrying out this idea, it is quite impossible for me to know whether 30s. to 35s. per cwt., London, would pay the growers. I accordingly put forward this suggestion for what it may be worth; though it seems to me that, assuming there was a profit of 1s. per bushel only for the class of fruit under review, it would be a better business proposition than shipping the fresh fruit here at a loss, apart from the important fact that the non-shipment of the fruit would improve the market for saleable fruit.

"In my opinion, the question of cider-making is also worthy of consideration. Some few years ago I wrote a very careful report on this subject, in which I gave full details regarding this industry in England; but I understood at the time that, for some reason or other, the idea was not entertained. If this was because the varieties of the apples are unsuitable for cider-making, then it would be very easy to graft good cider varieties on to the varieties which at present produce fruit which is unsuitable for export, (possibly for drying and for cider-making), and must, therefore, be regarded as useless."



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, March 12th, there being present Messrs. A. M. Dawkins (Chairman), C. J. Valentine, T. H. Williams, C. J. Tuckwell, J. Miller, G. F. Cleland, F. Coleman, G. R. Laffer, Col. J. Rowell, C.B., Professors Lowrie and Perkins, and G. G. Nicholls (Secretary).

Sheep Dips.—A letter from the Narridy Branch intimated that it was desirable that a sheep dip should be erected at the Crystal Brook saleyards, and sought the opinion and advice of the Board as to how to proceed. Mr. Williams thought that the Crystal Brook saleyards would be rather an awkward place for a sheep dip, and hoped that the inspectors would not find sufficient lousy sheep to justify the establishment of a dip there. He suggested that the farmers should form companies of 20 or more, and themselves build centrally situated dips. Certain landowners north of Two Wells had constructed dips, which they allowed their neighbors to use at a reasonable charge. The inspectors were fairly active, and they would continue to be on the alert. It was absolutely necessary that they should be active to stamp the trouble out. Mr. Valentine indorsed the idea of the farmers co-operating in the erection of centrally and conveniently situated dips. Professor Lowrie said it was advantageous to have dips at the saleyards, so that infected sheep could be dipped straight away; otherwise there was a likelihood, especially when the lousy sheep were carried on the railways, of clean animals becoming affected. On the motion of Mr. Williams, seconded by Mr. Valentine, it was decided to advise the Branch that the best plan would be for the farmers to erect dips co-operatively in the most convenient localities; and upon a suggestion from Professor Lowrie, to suggest that the erection of co-operative shearing sheds should be considered at the same time.

Selling Cattle by Live Weight.—The Secretary reported that the question of adopting the system of selling cattle by live weight at the abattoirs had been brought under the notice of the Metropolitan Abattoirs Board, and the general manager had replied that it was decided not to take any action in the direction indicated.

Noxious Weeds Control.—A resolution was received from the Quorn Conference urging the Government to take steps to secure the more effective control of noxious weeds. The Board decided to send the resolution on to the Minister of Agriculture.

Water for Pigs on Railway.—The Secretary of the Orreroo Branch wrote with reference to the frequent deaths among pigs in the hot weather during transit to Adelaide, as follows:—"In many cases these losses occur because there is no water available at the railway stations to pour over the pigs to keep them cool. A few weeks ago Orreroo owners lost several pigs valued at more than £20. The owners had to pay freight on the carcass and got no returns whatever. Recently one of our members lost from £7 to £9 in

this way in a consignment. At the meeting it was decided to ask the Board to bring the matter under the notice of the proper authorities, with a view to supplies of water being provided at the railway stations from which large numbers of pigs are trucked. For a number of years Orroroo has been one of the largest dairying districts in the State. The Pekina Irrigation Settlement is making rapid progress, and will further augment the large number of pigs sent from here annually. It is estimated that about 1,000 will be sent away each year. At Orroroo there is a water main less than 50yds. from the trucking yards, and members of the Bureau and all dairymen unanimously agree that the water should be laid on from this main to the yards." Mr. Williams mentioned that the hosing of pigs was not recommended, on the ground that it sometimes caused pneumonia. Professor Lowrie considered that the owners of the animals should study the weather forecasts, and forward their pigs only under favorable climatic conditions. At the instance of Mr. Cleland, it was decided to ask the Railways Commissioner if water could be laid on to the yards at those stations where a supply was available.

Life Membership.—Messrs. W. G. Mills and J. Downing, of the Kanmantoo Branch, who had been members of the Bureau since July 9th, 1888, were elected life members.

New Branch. Approval was given to the formation of a new Branch at Booleroo Centre with the following gentlemen as members:—Messrs. W. H. Nottle, sen., B. Nottle, W. Michael, M. P. Larkin, W. A. Giddings, B. Giddings, W. Whibley, Burns, W. A. Berrill, Powell, D. Michael, J. C. Collins, J. Carey, sen., J. Carey, jun., J. M. Carey, H. Kirkland, Jeschke, J. Llewellyn, N. Keahne.

New Members. Glencoe T. F. Gratwick; Moonta—J. Luke; Balaklava R. L. Butler; Whyte-Yarcowie C. Siebert; Blackwood—W. F. Fennell, H. Sullivan, W. Conlon, W. McNamara, L. Sullivan; Mount Bryan—A. Phillips; Hartley O. Klenke; Utera Plains J. C. B. Norton; Tint'nara—J. Bell, D. McKeand, G. Amos, B. G. Filmer, A. C. Filmer; Meadows—H. Thorn; Miltalie—H. W. L. Hill, J. R. Hill, H. Brine; Morphett Vale—Dr. C. Newland; Coorabic—F. Gurney; Utera Plains—W. E. Hier; Two Wells J. Williams, H. J. Wasley, H. J. Pederick, L. R. Simpkins, J. E. Gameau, H. D. Secomb, A. A. Wilson, A. J. Baker, R. J. Baker, E. H. Green, P. C. Cooper; Mount Barker—J. H. Coventry, G. Warland, J. Scrymgour, K. Scrymgour, L. A. Cockshell, W. W. Rawlings, J. Wilks, H. A. Monks, A. B. Fry, W. Jacobs, G. Boehm, E. F. Stevens, A. C. Smith; Blyth—A. Dunstone, D. Eldredge; Naracoorte—J. B. Walpole; Coonalpyn—A. I. Samuel, F. J. Tregenza; Kybybolite—G. Jimkins; Crystal Brook—J. Greig, J. H. Hill, G. Gum, A. J. L. Wilson, S. Billinghamst, E. Billinghamst; Pine Forest—C. Cronin; Orroroo—J. B. McDougall, E. Turley; Blackwood L. Porter, L. Winser; Lameroo—E. Davey, J. F. Jericho, A. J. P. Kumnick; Julia—B. G. Schmidt, R. W. Rowett, J. F. Freeman, W. Thiele, G. Mader, E. Richards, A. Dunstan, J. Dunstan, C. Nash; Wirrega—R. B. Knowling, F. J. Knowling, P. Leaney; Kalangadoo—M. Rogers.

THE WHEAT MARKET.

Not much activity characterised the local wheat market during March, but prices remained steady. At the beginning of the present month, on the receipt of intelligence of a firmer market in London, the local rate slightly improved, quotations for farmers' lots on April 5th ranging from 3s. 7d. to 3s. 7½d. per bushel, or about 1½d. per bushel less than on the corresponding date of 1912.

Under date London, March 7th, *Beerbohm's Evening Corn Trade List*, referring to the wheat position in England, states:—"There is no improvement in the general demand, and business has again been confined to Plate wheat, of which description a moderate number of cargoes have changed hands at about 3d. decline compared with a week ago. Shipments last week were liberal, including large quantities from the Argentine and North America; from all other countries, excepting Australia, exports recently have been on a small scale. Imports were again on the small side, and, as a consequence, there was a further sharp increase in the quantity afloat, which amounts to 6,535,000 quarters, or nearly 2,000,000 quarters larger than last year's total of 4,595,000 quarters. The increase is in the quantity afloat for the Continent, the United Kingdom proportion being the same as in 1912. In 1911 the total quantity afloat amounted to 6,200,000 quarters. The Indian wheat crop, judging from the record official reports cabled over this week, promises to be smaller than last year, but to what extent cannot yet be stated, especially as in some districts the growth of the crop, owing to the want of rain, is more backward than usual."

THE WORLD'S VISIBLE WHEAT SUPPLY ON MARCH 1ST.

	European.	U.S./Canada.	Total.	Eng. Average Price.	
	Qrs.	Qrs.	Qrs.	s.	d.
1913	10,580,000	14,820,000	25,400,000	31	0
1912	8,575,000	14,600,000	23,175,000	34	1
1911	12,255,000	9,200,000	21,455,000	30	2
1910	10,035,000	6,570,000	16,605,000	32	7
1909	9,180,000	8,400,000	17,580,000	34	6
1908	10,745,000	7,500,000	18,245,000	32	0
1907	9,055,000	10,050,000	19,105,000	26	9
1906	9,220,000	9,250,000	18,470,000	28	10

Date.	LONDON (Previous Day).		ADELAIDE.		MELBOURNE.		SYDNEY.	
	Steadily held.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.	Per Bushel.
March 1	Steadily held, not active	..	3/6 to 3/7	3/6½ to 3/7	3/6½ to 3/7	3/6½ to 3/7	3/6½ to 3/7	3/6½ to 3/7
3	—	..	Do.	Do.	Do.	Do.	Do.	Do.
4	Quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
5	Very dull	..	Do.	Do.	Do.	Do.	Do.	Do.
6	Quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
7	Steady	..	Do.	Do.	Do.	Do.	Do.	Do.
8	Steady, but quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
10	—	..	Do.	Do.	Do.	Do.	Do.	Do.
11	Firmly held, inactive; Liverpool steady, but quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
12	Steady, but quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
13	Quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
14	Very dull	..	Do.	Do.	Do.	Do.	Do.	Do.
15	Very dull, no demand	..	Do.	Do.	Do.	Do.	Do.	Do.
17	—	..	Do.	Do.	3/7	Do.	Do.	Do.
18	Firmly held; Liverpool very dull	..	Do.	Do.	Do.	Do.	Do.	Do.
19	Dull; Liverpool quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
20	Steadier tone, not active; Liverpool quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
21	Firm, with fair inquiry	..	Do.	Do.	Do.	Do.	Do.	Do.
22	—	..	Do.	Do.	Do.	Do.	Do.	Do.
24	—	..	Do.	Do.	Do.	Do.	Do.	Do.
25	—	..	Do.	Do.	Do.	Do.	Do.	Do.
26	Firm	..	Do.	Do.	3/7 to 3/7½	3/7 to 3/7½	3/7 to 3/7½	3/7 to 3/7½
27	Quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
28	Steady, but quiet	..	Do.	Do.	Do.	Do.	Do.	Do.
29	Firm, more inquiry; Dec.-Jan., 4/9½; Liverpool steady, no quotation	..	3/7	3/7 to 3/7½	Do.	Do.	Do.	Do.
31	—	..	Do.	Do.	Do.	Do.	Do.	Do.
April 1	Steady, no quotation	..	Do.	Do.	3/7½ to 3/8	3/7½ to 3/7¾	3/7½ to 3/7¾	3/7½ to 3/7¾
2	Firm, but quiet	..	3/7 to 3/7½	Do.	Do.	Do.	Do.	Do.
3	Steady	..	Do.	Do.	Do.	Do.	Do.	Do.
4	Steady, no quotation	..	Do.	Do.	Do.	Do.	Do.	Do.
5	Firm	..	Do.	Do.	Do.	Do.	Do.	Do.

STEAMER FREIGHTS.—(April 1st).—Steamers from South Australia to United Kingdom-Continent, full cargo rates, 32s. 6d. to 35s. (according to position) per ton (10½d. to 11½d. per bushel); to South Africa, 30s. per ton (9½d. per bushel). Parcels, Port Adelaide to London, Liverpool, or Continent, 30s. per ton (9½d. per bushel); Port Adelaide to Melbourne, 8s. per ton (2½d. per bushel); to Sydney, 10s. 6d. per ton (3½d. per bushel).

SAILOR FREIGHTS.—From South Australia to United Kingdom-Continent, 30s. per ton (9½d. per bushel); to South Africa, 27s. 6d. per ton (8½d. per bushel).

RAINFALL TABLE.

The following table shows the rainfall for March, 1913, at the undermentioned stations, also the average total rainfall for the first three months in the year, and the total for the first three months of 1913 and 1912 respectively:—

Station.	For Mar., 1913.	A'v'ge. to end Mar.	To end Mar., 1913.	To end Mar., 1912.	Station.	For Mar., 1913.	A'v'ge. to end Mar.	To end Mar., 1913.	To end Mar., 1912.
Adelaide ...	1.20	2.52	3.95	1.21	Hamley Bridge	2.96	2.20	4.56	0.83
Hawker	1.87	1.59	2.38	2.17	Kapunda ...	4.49	2.52	7.04	0.94
Cradock	2.29	1.78	2.80	1.40	Freeling ...	6.44	2.17	8.65	1.04
Wilson	2.14	1.74	2.89	2.80	Stockwell ...	3.62	2.15	6.36	1.31
Gordon	2.06	1.76	2.75	1.96	Nuriootpa ..	2.99	2.35	5.74	1.02
Quorn	0.79	1.64	1.97	4.11	Angaston ...	3.59	2.29	8.28	1.48
Port Augusta	0.96	1.75	1.83	2.24	Tanunda	3.76	2.59	6.98	2.02
Port Germein	0.76	1.73	1.31	0.88	Lyndoch ...	2.10	2.29	5.50	1.46
Port Pirie ..	0.74	1.77	1.53	0.88	Mallala	2.00	2.18	3.85	0.98
Crystal Brook	0.86	1.81	1.40	1.30	Roseworthy..	2.85	2.11	4.50	0.90
Pt. Broughton	0.55	1.79	1.14	1.65	Gawler	1.73	2.40	3.96	1.00
Bute	1.62	1.74	2.56	1.32	Smithfield ..	2.47	2.41	4.61	0.85
Hammond ..	1.01	1.70	2.01	1.49	Two Wells ...	1.62	2.12	3.30	1.00
Bruce	1.18	1.67	1.79	1.89	Virginia	1.86	2.22	3.79	1.21
Wilmington ..	0.73	1.97	2.11	3.33	Salisbury ...	2.31	2.35	4.85	1.34
Melrose	1.06	3.09	2.21	2.51	Teatree Gully	1.71	3.38	4.43	1.75
Booleroo Cntr.	0.85	1.95	1.67	1.36	Magill	1.35	2.97	4.18	1.91
Wirrabara...	1.48	2.13	2.44	1.57	Mitcham ...	1.26	2.44	3.83	1.08
Appila	1.30	2.18	1.92	1.21	Crafers	2.47	4.39	5.84	3.52
Laura	1.01	2.09	1.59	1.08	Clarendon ...	2.44	3.61	5.29	1.72
Caltowie	1.44	2.14	2.32	1.12	Morphett Vale	1.57	2.74	5.02	0.90
Jamestown ...	1.98	2.16	2.47	1.77	Noarlunga ..	1.28	2.32	3.33	0.63
Gladstone ..	1.02	1.88	1.46	0.87	Willunga ...	2.19	2.75	5.77	1.11
Georgetown...	1.26	2.25	1.75	1.23	Aldinga	1.64	2.62	4.28	0.84
Narridy	0.76	2.15	1.27	1.11	Normanville	1.02	2.13	4.02	0.94
Redhill.....	2.25	1.85	2.69	1.84	Yankalilla...	1.12	2.43	5.77	1.15
Koolunga....	1.46	1.98	1.81	1.36	Eudunda	4.61	1.95	6.18	2.13
Carrieton	1.74	1.72	2.13	1.34	Sutherlands ..	2.40	—	3.48	1.96
Eurelia	0.97	1.79	1.68	1.94	Truro	4.79	2.14	8.16	1.93
Johnsburg ..	1.58	1.41	2.15	1.51	Palmer	2.78	—	5.97	1.47
Orroroo	1.63	2.33	2.42	1.82	Mt. Pleasant.	2.60	2.72	6.04	1.25
Black Rock...	1.75	2.00	2.56	1.17	Blumberg ...	2.14	3.09	2.24	1.81
Petersburg ..	3.35	2.06	4.20	2.13	Gumeracha ...	2.24	3.21	4.95	2.16
Yongala	1.41	1.86	2.06	1.23	Lobethal ...	2.45	3.18	4.90	2.31
Terowie	2.50	2.00	2.82	1.43	Woodside ...	2.37	3.02	5.05	2.43
Yarcowie	3.60	1.98	3.94	1.62	Hahndorf ...	2.58	3.33	5.88	1.87
Hallett	3.15	1.95	3.51	1.32	Nairne	2.58	3.20	4.87	2.06
Mount Bryan	4.28	1.79	4.62	1.56	Mt. Barker ...	2.97	3.30	5.91	1.95
Burra	2.69	2.35	3.46	1.45	Echunga ...	2.75	3.30	6.08	2.35
Snowtown....	1.98	1.82	2.37	1.96	Macclesfield..	3.81	2.96	7.13	1.96
Brinkworth ..	2.10	1.96	2.64	1.12	Meadows.....	4.33	3.67	6.59	2.02
Blyth.....	2.64	1.98	3.24	1.51	Strathalbyn..	3.20	2.40	6.35	2.20
Clare.....	2.73	2.75	3.92	2.11	Callington ...	2.19	2.18	4.35	1.09
Mintaro Cntrl.	2.99	2.12	3.82	1.48	Langhorne's B.	2.74	1.94	3.73	1.19
Watervale...	4.58	2.65	5.98	2.29	Milang	1.50	2.16	3.23	1.04
Auburn	2.63	2.96	3.80	1.98	Wallaroo ...	2.10	1.83	2.38	1.81
Manoora ...	2.37	1.92	3.27	1.69	Kadina.....	1.77	1.88	2.24	2.08
Hoyleton ...	1.73	2.20	2.24	0.76	Moonta	1.12	1.87	1.49	1.77
Balaklava ..	1.79	2.01	2.36	1.04	Green's Plns..	1.14	1.57	1.58	1.29
Pt. Wakefield	1.74	2.12	2.24	1.71	Maitland ...	2.23	2.00	2.67	1.36
Saddleworth..	2.85	2.53	4.42	1.55	Ardrossan ..	1.91	1.62	2.32	2.06
Marrabel	3.13	2.10	4.38	1.20	Pt. Victoria..	0.94	1.56	1.25	1.67
Riverton ...	3.10	2.41	5.03	1.32	Curramulka...	1.96	2.01	2.37	2.05
Tarlee.....	2.36	2.16	4.69	1.49	Minlaton ...	1.56	1.74	1.83	1.76
Stockport ..	3.31	2.11	4.74	1.00	Stansbury....	2.18	1.81	2.68	2.21

RAINFALL TABLE—*continued.*

Station.	For Mar., 1913.	Av'ge to end Mar.	To end Mar., 1913.	To end Mar., 1912.	Station.	For Mar., 1913.	Av'ge. to end Mar.	To end Mar., 1913.	To end Mar., 1912.
Warooka....	1.26	1.58	1.61	1.88	Bordertown...	2.19	2.17	4.46	0.69
Yorketown .	1.05	1.63	1.34	2.27	Wolseley ...	1.70	1.82	2.86	0.27
Edithburgh ,	1.78	1.85	2.20	1.89	Frances ...	1.69	2.18	3.40	1.39
Fowler's Bay.	0.35	1.40	4.31	1.64	Naracoorte .	1.63	2.53	3.29	1.70
Streaky Bay.	0.72	1.63	3.16	1.74	Lucindale ..	1.74	2.36	2.48	1.13
Port Elliot..	0.92	1.41	1.33	2.06	Penola.....	1.98	3.20	3.26	2.88
Port Lincoln.	1.40	2.07	2.05	5.23	Millicent ...	3.63	3.31	4.98	2.56
Cowell	0.76	1.66	0.88	2.99	Mt. Gambier.	4.22	4.02	5.32	3.37
Queenscliffe...	1.02	1.72	2.20	2.27	Wellington .	1.95	2.21	4.06	0.70
Port Elliot .	2.24	1.48	3.43	1.87	Murray Brdg.	1.73	2.07	4.32	0.61
Goolwa.....	2.03	2.31	3.66	1.78	Mannum ...	2.56	1.79	4.28	0.81
Meningie ...	1.91	2.28	3.41	1.30	Morgan	1.86	1.47	2.35	1.60
Kingston	1.88	2.45	3.74	1.87	Overind. Cmr.	3.98	1.96	4.83	1.06
Robe	1.84	2.53	2.85	1.72	Renmark ...	3.65	1.73	4.86	1.21
Beachport...	3.14	3.06	4.28	1.77	Lameroo ...	2.79	—	4.47	0.54
Coonalpyn ..	2.66	2.05	4.24	0.90					

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of over 6,000 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Department reports on April 2nd :—

BUTTER.

There has been a much larger supply of cream this month than in the corresponding period last year, and the quality has been generally good, though there is a shortage in top grade. Owing to this there has been an increase in price, the present being — Superfine, 1s. 3½d. ; pure creamery, 1s. 2½d.

A. W. Sandford & Co., Limited, report on April 1st—

BUTTER.—Except for a little mugginess, the weather during March was cool. Supplies of butter and cream are naturally decreasing, but demand continues very strong. The present values are—Best factory and creamery fresh in prints, 1s. 1d. to 1s. 3½d. per lb. ; choice separators and dairies, 11d. to 1s. per lb. ; store and collectors, 9d. to 9½d. per lb.

Eggs.—The improved weather conditions have resulted in export inquiries, and values have in consequence firmed, prices now being—Guaranteed new laid hen, 1s. 3½d. per dozen ; duck, 1s. 4d.

CHEESE.—There is good inquiry in this line : all consignments meet with ready buyers, without any quotable alterations in values. Present prices, 6½d. to 7½d. for large to loaf.

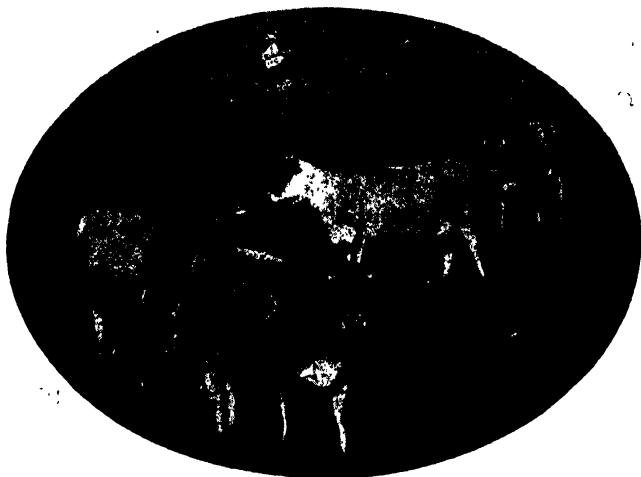
HONEY.—Supplies have been just about equal to demand, so that the rooms have been kept well cleared.

ALMONDS.—Good samples are very saleable. Unfortunately many lots have been damaged by exposure to the late rains. Brandis selling at 5½d., and mixed soft shells 4½d. to 5d. per lb.

LIVE POULTRY.—Forwardings have been very extensive ; in fact, quite equal to the Christmas markets. Owing, however, to heavy buying orders, both for local and overseas markets, good prices have ruled, especially for quality lots. Good table roosters brought 2s. 9d. to 3s. 6d. each ; plump cockerels from 2s. to 2s. 4d. ; hens, 1s. 9d. to 2s. 3d. ; ducks, 1s. 6d. to 2s. 6d. ; geese, 3s. 6d. to 4s. 6d. ; pigeons, 6d. ; turkeys, 7d. to 10½d. per lb. live weight for fair to good table birds.

POTATOES AND ONIONS.—There has been a steady demand for marketable samples of potatoes. During the last fortnight supplies have been extremely difficult to obtain, either locally or from the Gambier district, and prices have advanced. The main South-Eastern crop will soon become available, and these may therefore serve to check any further increase in price.

ONIONS.—There has been an active export trade in onions, and values have consequently improved.



AGRICULTURAL BUREAU.

SOUTH-EASTERN CONFERENCE.

PROFITABLE PAPERS AND DISCUSSIONS.

The Annual Conference of the South-Eastern Branches of the Agricultural Bureau was held at Penola on Thursday, March 20th. Among those present were the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), Messrs. G. Jeffrey and G. F. Cleland (members of the Advisory Board of Agriculture), W. J. Colebatch, M.R.C.V.S., B.Sc. (Manager of the Kybybolite Experiment Farm and Superintendent of Agriculture in the South-East), G. Quinn (Horticultural Instructor), P. H. Suter (Dairy Expert), H. Jackson (School of Mines Wool Instructor), and W. Gill (Conservator of Forests). The following delegates from the various Branches of the Bureau also attended :—Mount Gambier—R. Fowler, G. H. Kilsby, A. A. Sassanowsky ; Penola—H. Ricketts, J. Darwent, J. Alexander, D. Adamson, J. Warner, A. H. Strong, S. Ockley, P. H. Kilsby, L. H. Peake, S. Norman, E. F. McBain, H. Richardson, J. T. Williams, W. Miller, F. R. Field, W. Hoffmann ; Kalangadoo—D. W. Tucker, T. Bott, W. Heming ; Millicent—H. Dav, J. Bowering, J. Holzgreffe, J. Mullins ; Naracoorte—L. Wright, W. H. Smith ; Kybybolite—A. Bradley, E. C. H. Schinckel.

INTERESTING EXHIBITS.

A feature of the Institute Hall, in which the proceedings were conducted, was the remarkably comprehensive display of products of the district, including a magnificent lot of apples (principally export varieties), pears, grapes, walnuts, dried fruits, potatoes, onions, peas, cucumbers, rhubarb, French beans, marrows, trombones, pumpkins, green fodders, maize, wheat, oats, barley, and cheeses. There was a fine collection of bottled wines and brandies, staged for the Chateau Tanunda Company (Coonawarra), by the manager (Mr. A. H. Strong) ; some excellent sparkling apple cider and cider vinegar, put up by Messrs. H. and H. B. Richardson ; and an admirably executed egg cruet, turned out of different sorts of Australian wood by Mr. A. T. L. Peake. Others represented were—Messrs. A. J. Hiscock, A. Weber, W. Patterson, J. Warner, S. Ockley, L. Stapleton, J. Alexander, L. Marks, J. Darwent, M. Yeates & Sons, A. Snelling, R. Lear, R. Howard (Penola Cheese Factory), J. Skinner, W. Hoffmann, H. Ricketts, J. Redman, Stapleton and Burkett, Yallum Estate, Penola Public School, Kybybolite Experiment Farm, and the Naracoorte Branch of the Bureau.

VISITORS WELCOMED.

The Chairman of the Penola Branch (Mr. H. Richardson) presided, and, in extending a hearty welcome to the visitors, said in Mr. Pascoe they had at the head of the Agricultural Department a man who had shown marked ability in the discharge of his onerous duties. They also duly appreciated the worth and the services of the members of the Advisory Board and the officers of the department, and looked forward to deriving much pleasure and profit from the addresses which the latter would deliver. The delegates from the various Branches of the Bureau were not so numerous as he would like them to have been, but any weakness in that respect, which could be traced chiefly to the serious travelling disabilities, would be more than counter-balanced by the enthusiasm of those present. As an illustration of the transit difficulties, he mentioned that members of the Kingston Branch who might have desired to attend the Conference would have been obliged to leave home early on Monday morning, and would not have been able to return before Friday night. The facilities for travelling in the South-East were indeed marvellous. (Laughter.) In behalf of the Conference he deeply sympathized with the Naracoorte Branch in the loss it had sustained through the death of the Chairman (Mr. E. Coe), whose memory would always be cherished, and whose work might well be emulated by all other members of the Bureau. Although that was not the first Conference which had been held at Penola—as a visitor about 20 years ago he was present at the initial fixture, and also at a dinner given by the late Mr. John Riddoch, who, he believed, was one of the founders of the Penola Branch—he hoped that the interim between it and the succeeding one would not be so great as that which separated it from the previous one. (Hear, hear.) He paid a forceful tribute to the late Mr. Albert Molineux, the first secretary and originator of the Bureau system, and expressed the opinion that the display of products which graced the hall might be accepted as convincing evidence of the immense possibilities of the South-East. There was a splendid future, he considered, ahead of the viticultural industry, and cited what it, combined with the natural saving capacity of the people, had done for France as an object lesson to local culturists. In conclusion, he emphasized the fact that it was the duty of the people to do all in their power to assist the country to be self-contained, and he hoped that much good would result from the deliberations that day. (Applause.)

THE OPENING ADDRESS.

The Minister of Agriculture thanked the Chairman for the hearty welcome which he had accorded to the members of the Advisory Board—a very useful institution composed of men of almost infinite wisdom. At any rate, one of them only that morning had suggested that the world would have been a better place if only the Creator in the first instance had had the benefit of

the Board's advice. (Laughter.) Speaking seriously, however, they could hardly realise what an advantage it was to the Minister of Agriculture and the department to have the assistance of such men. The positions they filled were honorary, yet there had never been a district conference which he had attended at which one or more members of the Board had not been present. That proved that they not only took a keen interest in the work and welfare of the primary producers, but that they were prepared to sacrifice valuable time at the monthly meetings of the Board, and in visiting the rural conferences so that they might be better able to serve them. As Minister he was also glad of the keen appreciation shown for the members of the staff. It was not always that their efforts were properly appraised and recognised by the farmers, or that their advice was deemed to be worth following. It had been particularly gratifying, therefore, to note the cordiality of the feeling toward them, because he realised that the success of the department depended so largely upon their ability and enthusiasm. Another pleasing feature was the presence of so many representatives of the press. He was sure that the Conference would be reported well, not only in the daily, but also in the South-Eastern newspapers. It was a gratifying sign to see the press taking such a keen interest in the primary industries as to send reporters long distances to take notes of the proceedings. He was delighted with the excellence and quantity of the various products which had been staged. They spoke well for the fertility of the soil, but better for the men who were using the land to such good purpose. The display strikingly demonstrated what might be accomplished by those who were determined to utilise their opportunities to the fullest extent. He heartily congratulated the South-Eastern Branches, especially the Penola Branch, upon the splendid character of the exhibits. So far as his memory served him the display was second to none he had seen at a similar gathering in any part of the State. Having referred to the fact that agriculture was becoming more of a science and less of a haphazard business, he briefly outlined the differences between the climatic and other conditions in the North and those in the South-East, and in the problems associated with them. Although they in the South had overcome some of the difficulties which confronted them true, probably, not to the same extent as the farmers in the North had succeeded—there were still others to be surmounted before the whole of the South-East could be brought under successful occupation.

IMPORTANCE OF DRAINAGE.

Realising the necessity for so doing if the country was to be utilised to its fullest capacity, the Government proposed to spend upon drainage in the South-East about three-quarters of a million sterling. Already about £427,000 had been expended, and to complete the schemes a further £300,000 would be required. That money was not being spent merely to bring work into

the country, but to enable the land to be profitably occupied by the farmers, gardeners, and others. The ultimate success of those drainage works depended largely upon the landholders themselves. When at Kybybolite Experiment Farm on visiting day last year, one of the most striking object lessons he had noticed was in a corner where the drain made had not been sufficiently large to carry off the surplus waters, with the result that that part of the field had been flooded, and the crop had been much inferior to those in the paddocks where the drains had proved equal to the demands upon them. Whether Mr. Colebatch had purposely made that particular drain small he did not know ; but he felt at the time that it ought to have taught a lasting lesson to all the landholders present, and have convinced them of the absolute necessity for all doing their part in connection with the great drainage system. Success in the South-East was not going to be won easily, but it would assuredly be attained by enterprise, energy, and hard work. They had a comparative area of good soil, other soil which could be utilised, and what were described as "waste lands," which could be gradually brought into profit. With the right type of settlers—and they had proved that they possessed them, particularly among the members of the Bureau—the various problems would undoubtedly be solved, and success would be realised.

↑ AISING : STOCK.

In considering the future of the South-East he had thought that probably the greatest industry would be, like that in some parts of the United States, not giving up cultivation for stock, but cultivating for stock ; or, as the Yankee put it, making the crops walk off the place instead of carting them off. He did not think they would ever compete successfully with the North in regard to cereals ; but by cultivating special fodder crops they should be able to secure a better return per acre than was possible in the North. In that connection he advised them not to launch out on a large scale, but to move ahead quietly and steadily. He believed that first by the system of drains and then by the utilisation of their brains as well as their muscles, and given the transportation facilities which they would have when the Mount Gambier to Portland railway was built, the South-East would become one of the most successful portions of the State. He had pleasure in declaring the Conference open, and wished it every success. (Applause.)

FRUIT-GROWING FOR PROFIT.

Mr. H. Richardson (Penola) said that when a man launched out into any business it was to make not only a living, but, according to the capital invested and the nature of the industry and risk, to win a fair return in the shape of interest and profit. That was the incentive to all labor, and if it were destroyed individuality would be crushed and human machines would result. In fruit-growing these same factors were the dominating note of the enter

prise. Business men thought hard, but the man who took up fruit-growing should think so hard that, whatever results might be, he would become as hard as steel on which the 100 ton guns of disappointment and misfortune could make no impression. The first requisite was capital. Assuming that this was available, the selection of the country suitable for the purpose was the next step. According to the special nature of the planting to be undertaken the soil must be selected. Although some soils were better suited for particular kinds than others, fruit trees were cosmopolitan in that respect, and would adapt themselves to a wide range of conditions. Nevertheless, a loamy or a sandy loam soil, with depth, was the best for fruit-growing, and this could be worked with less labor than heavier soils. To grow for profit it was necessary to plant for profit. Mistakes had been made in the past and would be again, and they would never be wholly avoided in new districts. In proved districts it was advisable to obtain the experience of reliable growers; in new and untried country it was well to take the few varieties sought after which commanded the market. Time alone would prove the suitability for the conditions under which they were growing. A selection of only a few of the recognised best varieties also had this advantage: It would facilitate the handling, and the ripening period not overlapping to any extent, the grower would be able to deal with crops better. Distance from market must be considered. Soft fruits did not carry well, and the grower would have to fall back on other means of disposal, such as drying. Heavy labor was involved in that work, and a worrying time was experienced, but it was a safety-valve for any surplus fruit. If a man's family could handle fruit at the prices for the last year or two, drying would be a payable proposition. The trade, as conducted now, was not for the growers' benefit. There was always the "other fellow," or several between him and the consumer, and while these conditions continued the profits would go largely to the wrong pockets. There was one remedy, and until it was more fully realised, and a spirit of confidence established between the community of producers, fruit-growing for profit would be on the bare margin side. By co-operation, however, which was another word for pooling, a more equitable distribution of profit would result. Small things assumed large proportions at times, and unless economy in the working expenses was exercised, reduced profits would be the result. A thorough system, a close study of the details connected with orchard work, the will to accomplish, and the knowledge that to take on too much was bad policy, together with a kindly disposition on the part of Providence to smile on his efforts, might enable the fruitgrower, during many days, to realise that he had grown good fruit, if not for profit.

APPLE EXPORT TRADE.

Mr. G. Quinn (Horticultural Instructor) said producers had shown their ability to grow within the State fruit comparable with any of the kind in the

world. It seemed to him that they had come to a parting of the ways, and that the time had arrived when the fruitgrowers needed to pay more attention to the business side of handling produce. His statements with regard to co-operation, made before the Fruits Commission, had been subjected to some criticism, so that he was glad of the opportunity to again refer to an undertaking which he believed would lay the foundations of the future well-being of the fruit industry, and especially apple production. At present apples were being exported to European markets on an ever-increasing scale, and to a lesser extent to Asiatic countries, while the possibilities of the demand in South and North America were being tested with experimental shipments. Five States of the Commonwealth were participating in the trade. Tasmania was the pioneer, and from her ports more than half the total quantity sent away was still shipped. Victoria, however, was fast pulling up. South Australia stood third, Western Australia fourth, and as yet New South Wales was a long way in the rear.

UNIFORMITY REQUIRED.

In all those States the acreage which was being planted to apples was surely extending, and it was high time the placing of the trade on a sound basis in every one of its phases should be undertaken. That task was of more than State importance, and consequently while it behoved the fruitgrowers of each State to set its house in order, there must, before the compact was complete, be a clearly co-ordinated plan suitable for adoption throughout the Commonwealth. About six years ago, when the regulations under the Commerce Act were put into operation, it was expected in a vague way that that measure would achieve the object in view. Such, however, had not been the case, because the Commerce Act was only a trade descriptions Act of limited powers, and providing the cases were branded in accordance with the contents, and their condition in relation to disease and certain minima of sizes were observed, the apples might be shipped. Therefore the fullest observance of the provisions of the Commerce Act fell far short of what was widely believed to be necessary to secure uniformity in the export trade in some of its most important particulars. The points on which uniformity was desired were—(a) Nomenclature for the apples, (b) grading by sizes and marks to indicate same, (c) systems of packing, (d) standard of soundness, and (e) standard-sized cases. In respect to the first, an inter-State nomenclature committee had been formulated, and it was proposed to collect and bring together typical specimens of the leading varieties of apples which possessed more than one name grown in the different States, and decide which name had priority for each variety.

GRADES AND MARKS.

Regarding the grades and marks to indicate same, the normal sizes of the varieties shipped were now well known, and it should be possible for a

committee of growers and Government instructors or inspectors to decide what should constitute first, second, or third grade sizes for each kind of apple. In the past not only had every packer marked what he considered to be the proper grade upon his case, but had followed his own fancy concerning the figures or letters and the arrangements of such figures or letters to indicate that grade. As an illustration, one person might mark his best fruit "A" and his poorest "AAA," while another branded his smallest "A" and his finest "AAA." Those figures, even when placed in the same order on the boxes, never meant the same size and quality in the produce of any half-dozen shippers picked out at random. That could not fail to make for confusion and uncertainty in the minds of the buyers at the other end. It was claimed that by making and adhering to definite standards for grades and symbols to represent the same, confidence would be engendered among buyers. Relatively to the methods of arranging the apples in the cases, there seemed to be a somewhat too slavish adherence to the original straight packs. The adoption of some of the diagonal and triangular packs so much used in America would be worthy of more general attention. One great advantage which accrued to apples placed in the last-named manner in the box was that no apples rested directly upon another, and consequently, if increased pressure should be brought to bear or shrinkage take place, bruising was much more effectively averted.

STANDARD FOR EXPORT.

The adoption of a standard for what constituted a sound apple offered a somewhat more complicated problem. Every one who had studied the question had arrived at conclusions upon it, but so far as he was aware the statement of those conclusions in clearly defined language had not often been accomplished. They might agree that fruit in an overripe condition was not only unlikely to carry safely to its destination, but was calculated in decaying to injure the contents of the surrounding cases. Apples visibly affected by "bitter pit," while not likely to affect their neighbors on the voyage, would nevertheless deteriorate further, and spoil the reputation of the remainder of that brand, if not of the whole shipment. Fruits visibly bored by codlin moth caterpillars were damaged, and consequently depreciated in value. On the other hand, apples marked with the black spot fungus commercially damaged just so far as the extent of the blemishes extended. There were other aspects not to be overlooked, including fruit which was immature, and would shrivel and could not possibly develop the size, texture, flavor, and color peculiar to its variety. Such fruit was decidedly inferior and damaging to the good name which that variety might be known to have possessed. A consignment of unripe Jonathans, for instance, could be calculated to cause buyers to depreciate the true value of that sort in later shipments even below what was really warranted. Lastly, the trend of public

opinion in the older countries in respect to the admission of fruits upon which any communicable plant disease might be found, must not be overlooked. The presence of San Jose scale on a couple of cases of fruit sent from one Australian State had caused the imposition of an examination fee upon Australian apples equal to 1d. a case in German ports, or a loss last year of upwards of £250 to South Australian apple growers. That, he presumed, was the cause which had led the Federal Government a few days ago to issue a prohibition order against the exportation of all apples grown in any orchard affected by San Jose scale. That order, however good it might be in intention, must prove unwarrantably severe in practice.

AMENDED LEGISLATION DESIRABLE.

The standard fruit case for the export trade needed no argument, and only a short step was required to make it an accomplished fact without imposing hardship, because on that phase, public opinion, as represented in the exporters of apples, had been pretty well educated by experience. Uniformity throughout could be brought about within a reasonable period only by the pressure of public opinion, but that must be expressed in terms which would make it impossible for those who would break away from the desires of the majority so to do. To that end he suggested that the authorities who now controlled exports - the Federal Government - should be asked by the fruit-growers to legislate, either by amending the present Commerce Act, or otherwise, so that no apples could be exported unless they were branded with the correct name, graded within certain sizes, and branded with uniform symbols to indicate those grades. A standard of soundness should be decided upon and enforced, and one or more standard sizes of cases should alone be allowable as packages for holding export apples. To conform to such a law need not impose hardships upon the shippers, more particularly if the various State Departments of Agriculture accepted the standards fixed, and used their organisations for a brief period in educating the packers of apples into the requirements of the law. The packers and growers, by the formation of loose co-operative bodies in various centres, could more easily procure grading machinery, and by locating it in central packing sheds set up district brands, so that buyers of apples in Europe could with perfect confidence purchase, as the buyers of dried fruits were now able to do all over Australia, on the reputation which it was possible for a brand to attain.

VARIOUS VIEWS.

The Chairman, in inviting discussion, commended the practical points enunciated by Mr. Quinn, as he realised that there was room for a great change if producers were to get the reward they deserved for their industry. He hoped to see practical results arising from the suggestions in the near future. (Hear, hear).

Mr. A. Sassanowsky (Mount Gambier) congratulated Penola upon the fine display of horticultural exhibits. They provided sufficient evidence of the fertility of the district and its suitability for growing fruit of fine quality. A fact which could not escape the observant traveller, either in the South-East or Tasmania, was the productiveness of poorer lands for fruit growing. If they were going to make a success of the South-East they will have to develop their poorer lands. Intense cultivation, *i.e.*, utilisation of the inferior lands was essential to greater development. The maize exhibits provided an example of what could be accomplished in the production of fodder. Combination amongst growers was desirable, so that where possible, by means of common plants, packing sheds, &c., they could co-operate to supply better articles of uniform grades. He did not say they could do away with agents altogether, for if the growers put up good articles under reliable brands, the big houses could sell them with greater advantage than the growers, as it took money to fight money. The Farmers' Co-operative Union had put up a great fight, and were now coming to the fore, so that instead of them going to large warehouses, the buyers were now coming to them. He saw no virtue in branding fruit grades 1A, 2A, and so on, and suggested that the designations A, B, C, were more distinctive. Combination among fruit-growers in packing-sheds and other ways would produce a certain quality, and a reliable article was the root of any system calculated to help them to sell to the best advantage. The South-East could compete with the world for quality in fruit production - the thing was to market so that the grower got the profit he deserved. (Hear, hear.)

Mr. J. Darwent (Penola), speaking as a practical fruitgrower of Coonawarra, believed there was necessity for co-operation. Coonawarra was the chief local centre of production, and co-operation had been tried there, but had not achieved the measure of success they had hoped for. A few of them were in favor of having packing-sheds, grading, and working somewhat on the lines of Mildura and Renmark. They had difficulties in new districts through planting unsuitable varieties, or too many varieties. When Coonawarra was started, Adelaide friends warned them not to plant the Cleopatra apple because it was susceptible to *fusieladium*. That variety, however, had proved the best selling variety in London, and had brought the highest price for Australian apples in Germany. It thrived admirably at Coonawarra. They found on stony land they could grow stone fruits to perfection, but it was not suitable for apples. Land with a clay subsoil, even if the surface was light and sandy, was suitable for pip fruits, and thousands of acres of stringybark country was available for this purpose. The exhibits of fruits grown by Messrs. Yeates & Son, provided an illustration of what could be done in that country. They had land in the district admirable for barley and oat growing, and some useful for wheat production. He regretted that the member who undertook to arrange for the display of cereal samples

had failed to attend to that matter. Some of their settlers had grown some of the finest barley and oats in the South-East.

Mr. G. H. Kilsby (Mount Gambier) said that for the production of some fruits, some Mount Gambier land, valued at £50 per acre, was not suitable. He knew that lands that could have been bought for 50 pence an acre, near the Glenelg River and towards the Victorian border, that would produce the best class of fruits of some varieties. Now it was largely waste land, running a few kangaroos, rabbits, and sheep; but with population and transit facilities, they would eventually see it producing some of the finest apples in the world. He congratulated Penola upon its horticultural products, but realised that as producers they must co-operate to get the best results for their labors.

Mr. G. F. Cleland (Advisory Board) said that he had found, as an olive oil and wine manufacturer, that they had to put out an article under a label that the buyers could take as a reliable indication of standard of quality. For fruitgrowers to attain best results they needed the millenium, which, as Oliver W. Holmes had said, would come when they found the biggest strawberries going downwards in the punnets, and the biggest potatoes at the bottom of the bags. To get the best returns it was essential to create confidence in the minds of buyers, and this could be done by marketing reliable brands. With co-operation among the fruitgrowers, and the sinking of jealousy among neighbors, they could put more money in their own pockets. (Hear, hear.)

Mr. G. G. Nicholls (Secretary Advisory Board) praised the local exhibits as the best he had seen at a Conference of Bureaus. His business was organisation, and he suggested that it might be advisable for local Bureaus interested in co-operation to form committees to consider the suggestions made by Mr. Quinn concerning co-operative effort. There was a tendency sometimes for conferences to end in smoke, so that he urged them if they saw an opportunity of profiting from the discussions to follow it up by action, and take advantage of the Bureau system as a means to realise some definite purpose. The Bureau really was a practical form of co-operative helping of neighbors and settlers by exchange of practical experiences and opinions, and it had been described by the Director of Agriculture (Prof. Lowrie) as the only co-operation among producers which had stood in the State for a quarter of a century. (Applause.) If they thought suggestions made worth working up in the interests of their industries, they might use the local Bureaus as a means of furthering their aims, and they might be able to institute the first line fruitgrowing co-operative movement in the South-East.

The Chairman supported the remarks of the Secretary, although he knew a case where co-operative effort had failed not 100 miles away. In fact it ended in disastrous failure. (Voice—Why?) He would not go into reasons,

but perhaps, at the particular time he referred, members were not fully established, and were not so strong numerically as they were now. The measure of success was disappointing and the venture went into liquidation. However, years had gone by, times had changed, and the spirit of co-operation was in the air, and they wanted the apathetic to be leavened by it. They had a fruitgrowers' association at Coonawarra which had been hammering at the subject for years; but if they tried and tried again, eventually they would reach a successful issue.

FARM BUILDINGS.

Mr. S. Ockley (Penola) read a paper on "Farm Buildings." As a comparatively new settler he was confronted with the problem of determining the most convenient site and design for farm buildings, having regard to the probable full utilisation of the land and the space to be allowed for more buildings as required. Convenience of structures was so important that it ranked as the very first consideration. He strongly deprecated erecting substantial and expensive yards and buildings without reference to the most convenient and effective method of operating the farm. The man whose permanent structures were placed in the most suitable positions was able to save many hours, and even days, each year in carting his hay to the stockyard and feeding and watering the horses. A further saving could be effected by growing the green crops near to the stables. Reckoning the monetary value of the saving at £10 a year, that would be equivalent to 5 per cent. interest on £200. In other words, the conveniently situated buildings were worth £200 more than those badly placed, although there was no difference in the cost of erection. In his opinion the wisest procedure was to erect at first the cheapest buildings possible—structures not expected to last more than six or eight years, by which time the farmer should have become thoroughly acquainted with the land and the requirements. That district was plentifully supplied with useful bush timber and thatch as well as red-gum slabs from the sleeper sawing mills. Those three things furnished building requisites at the minimum expense, though unless put up by experts they become unsightly in a few years. His own ambition was to have all stone and iron sheds, as building stone was easily obtainable, likewise good limestone for burning lime. It would be rank foolishness, however, to start such permanent erections until the land was properly subdivided and the producing power properly known. The farmer who puts up with inconveniently built and situated sheds and stables for the sake of keeping a treasure deposit in the bank to bring in its annual per cent. was gaining 3 per cent. or 4 per cent. and losing 8 per cent. or 10 per cent. every year. Perfection of design and position in structures went a considerable way towards ensuring continual success, and enabling the farmer to be satisfied with his year's operations. There must be many progressive men in the Bureau who had spent all their lives on the land and prided themselves on

the perfection of their properties and buildings. If the designs of premises were published in *The Journal of Agriculture* an immense benefit would be conferred upon hundreds of farmers. Any faults in permanent buildings caused loss which continued year after year, and ultimately amounted to a considerable sum. Therefore too much thought and care could not be exercised in planning out the farm and its buildings.

OTHER OPINIONS.

Mr. W. P. Tucker (Kalangadoo) agreed that the farmer, when first going on the land, should not be in a hurry to erect his homestead and stables in a substantial way until experience had taught him the best site for convenience and comfort. He suggested that it was desirable to locate the stables on the poorer parts of the property, so that the manure could be readily distributed where it was most needed. If the stables were placed on the rich land the manure would have to be carted out. The recommendation that plans of farm buildings and conveniences should be prepared by practical farmers and published in the *Journal* met with his approval.

Mr. A. Sassanowsky complimented the writer of the paper. He advocated placing homesteads, stables, and conveniences as nearly as possible in the centre of the property. They would then be in a position to save time in travelling to work, and would be able to water each paddock from one windmill. The farmer would be in a position to regulate supplies for sheep with the greatest convenience. He advocated placing the chaff shed at the back of the stable, and about the centre instead of at the end. The chaff should be put in from the other side to which it was taken out. The chaffing works should be placed at the back, so that the shed could be filled conveniently. The haystack should be handily placed to minimise handling. It was urged that there was danger of fire, but they had to face that risk for the sake of convenience. In chaffing they should not leave the chaff in one heap, but while one man was sharpening up the fodder could be scattered so that the grain in the chaff would be well distributed. If they did not want to invest in more buildings they could erect an open skillion around the shed, all except in the front, and implements could be kept under cover.

The Hon. Minister of Agriculture said he was pleased with the practical tone of the paper, because it was prepared by a young man anxious to do the right thing for his farm. In the South-East he thought there was one factor to be considered in deciding upon sites for houses and stables. The country was often wet and ill-drained, and low-lying positions were damp and unhealthy. He thought the first consideration should be the health of the people and the stock, and considered that the buildings should be placed on high land. He knew from experience in the North, where improvements had been laid out on a plain almost in the centre of the property, that after three-quarters of an inch of rain you could not walk 100yds. without boots

becoming four times enlarged by the adherence of sticky red soil. In the horse yard there might be 5in. or 6in. of loose soil converted into sticky mud. The value of improvements could not be gauged by cost. Some men would put up conveniences that proved more effective and necessary than those erected by others at two-thirds greater cost. He had seen big pastoral holdings where stock had to be withdrawn from some of the paddocks because they could not get water into them. In other cases the owners had spent less money in laying out, but had subdivided, &c., with wisdom, so that each paddock was supplied. His advice to the young man going on the land was - "Do not build your improvements for the farm, but make your farm build its own improvements, thus ensuring the success of the farm generally."

Mr. Kilsby hoped that plans of practical farmers would be published in the *Journal* for the benefit of those making their initial outlay on the land.

Mr. Nicholls advised members of the Bureau to send in rough plans to the Department of Agriculture. A selection could be made by members of the Advisory Board, and when drawn to scale the best would be published. (Hear, hear).

The Chairman suggested that Mr. Sassanowsky should send in plans. Other delegates might do likewise. Limited capital was often a drawback in the earlier occupation of land, and so they could see, even from the railway carriages, occasional mud houses and stringybark outhouses. Such miserable structures were an eyesore, but as prosperity followed occupation more aesthetic buildings would replace them. They need not necessarily be very expensive, as farmers could supply much of the necessary labor in the course of a year.

Mr. Kilsby said one of the most convenient of farm buildings was a large hay shed, to protect grass, hay, and other fodder. It need not cost much in the South-East, where posts and timber were easily procurable. Another shed of great convenience was an open shed, under which loaded wagons could be driven and left overnight, or throughout the day, safe from the glare of the sun or downpours of rain.

Afternoon Session.

WOOL-HANDLING DEPOTS.

Mr. H. Jackson (School of Mines Wool Instructor) discussed the formation of dep'ts for the handling of the small producers' wool clips on co-operative lines. He pointed out that there were two schemes. One, which he wished particularly to elaborate, was that the growers should have some centrally situated place in each district to which their wool could be sent, and there, after the weight of each man's consignment had been ascertained, be graded and prepared in the best possible manner for marketing. The other was to

have co-operative shearing sheds where the farmers could have their sheep shorn, and each flock's wool handled independently. Under the former system the wool would be mixed together, but that would not be any detriment to it. Growers generally should recognise that wool varied in price according to its condition, quality, and suitableness for different purposes. By means of a depôt conducted on the lines just indicated, instead of much of the wool produced in a district going to market in small ragged lots, as was the case at present, it could be put up under one distinct brand, guaranteed to have been properly skirted and classed, and in every respect be fit for the competition of the people who were prepared to pay the most money for it. That system would eliminate the dealers who bought the small mishandled clips, and, after having properly classed them into one big parcel, put this on the local market or shipped it to London, and reaped the benefit of the knowledge and experience they had employed. The producer, before anybody else, was entitled to the utmost value of what he produced; but unless he took steps to learn how to prepare his goods in the manner desired by the purchaser he could not expect to reap a full measure of success, and would have only himself to blame. There was no doubt in his mind that the depôt system would exercise a marked influence for good in connection with the sheep and wool industry in South Australia. Difficulties were certain to arise, but he thought they could be surmounted. At the same time he wanted growers to understand that he was not urging them to rush headlong into the matter. It was years ago in New South Wales that he first was impressed with the fact that the small woolgrowers, in many instances, were losing a fair amount of money each year on their product. Thereupon he went into the business of buying wool, and after getting it up, reselling it. He did satisfactorily financially until the slump came and knocked him out. Since then he had advocated the depôt system extensively in the mother State, and many big dealers had adopted it with profitable results.

GET RID OF THE JEALOUSY.

He felt convinced that if they could get rid, to a certain extent, of the jealousy which always existed between growers, the establishment of depôts would prove to be a wise and beneficial move, because not only would it lead to better returns being secured by the growers directly concerned, but the standards of the sheep kept and the wool cut would be appreciably raised. On coming into the depôt each man's wool would be opened up separately and classed, and the weights of the lots in the different classes carefully noted. In that way the various wools would be properly matched, and the lines would be made even from end to end. The aggregate clip might not be even in breeding and production, but those points would receive due attention as time went on. Copies of the weights and descriptions would be forwarded to the brokers, and they could settle with the growers direct, or else the depôt

could receive the lump sum and distribute it according to the values obtained. Each grower would know exactly what the others had received and the character of their grades of wool, and the fact would be impressed upon them that their aim should be not so much price per pound as price per head. At the outset the buyers might look askance at the *dépôt* system, but directly they saw that the wool was being handled by the men who produced it with the primary object of placing it upon the market in the most attractive manner, confidence would soon assert itself in their minds, and in bidding for the wool they would not allow themselves to be influenced by fractions of a penny a pound. In other words, if the quality and character of the stuff so warranted, they would not hesitate to rise for it. In advocating the innovation he did not want to influence the men who were already sending in fairly big clips of, say 30 bales and over. The men he desired to impress particularly were those who cut only a dozen or more bales each. If they did not care to adopt the *dépôt* system co-operatively there was no reason why they should not ask their brokers to handle the wool as he had suggested, and charge them a fair price for the labor involved. The principal expert employed by a large Melbourne firm made a boast of the fact that each season he so treated hundreds of bales made up of small farmers' clips, with results eminently satisfactory to all concerned. If they did not feel disposed to get their brokers to do the work they might even ask the Government to have it done. But, perhaps, as a start, the best plan would be for them to each send in a few bales to their respective brokers next season, and give the system a trial. Personally, he was convinced that it would pan out well. Experience had demonstrated conclusively that classing paid, and it behoved them, therefore, to see that their wool was handled to the best advantage. Many of them dealt with their fruit on co-operative lines, and there was no reason why they should not deal with their wool similarly. Then, again, they had no objection to their wheat being mixed up with that grown by other farmers, so why should they hesitate to have their wool placed with that produced by others, especially when by so doing they would reap appreciable benefit?

HELPING THE SMALL MEN.

As the School of Mines Wool Instructor his work chiefly was to give instruction to students on the lines so ably laid down by the first instructor (Mr. George Jeffrey), and thus assist the big station owners in the preparation of their clips for market. Now the get up of those clips, owing mainly to the initial work of Mr. Jeffrey, compared most favorably with any others in the Commonwealth. The wool clip of the State was worth nearly £3,000,000 per annum, and the importance of the part taken by the School of Mines students would be realised when he explained that they handled each season wool to the value of approximately £300,000. In superintending their work last season he travelled about 12,000 miles. What he would like to do to a

much greater extent than was possible under existing conditions was to get into close touch with the small woolgrowers who could not afford the time themselves or send their sons the long distances to Adelaide, and instruct them in their shearing sheds during the progress of the shearing operations. Help and advice given at such a time and under such conditions would be infinitely more effective than a dozen ordinary addresses. He looked forward hopefully to the period when his desire in that respect would be realised. The question had been put to him that afternoon whether it would pay to grow special fodder crops with a view to improve the wool production. His answer was that he did not know. There was a lot to learn regarding wool production from the standpoint of the small man. There was no doubt, however, that when a sheep was fed well it would produce a good carcass and a good fleece, but whether it would pay to grow special fodders for wool production had yet to be ascertained. He suggested that they should experiment for themselves. The matter was one well worthy of being carefully investigated, and probably the results recorded would be extremely valuable. (Applause).

DISCUSSION.

Mr. Darwent (Penola) considered it would pay the sheepowners to grow a certain amount of special fodder at the time of the year when it was most needed to keep the stock in good condition and the staple growing. It was well known that the wool of sheep which received a check was weakened.

Mr. Kilsby (Mount Gambier) thought that the wool dep't system would tend to take away the individuality of the growers. Every man who had grown wool for some years liked to see his own brand on his bales, and there was a certain amount of rivalry which it would be inadvisable to diminish. At the same time there was much to commend the system. He was satisfied that if it would not pay to grow special crops merely for wool production it would for fattening purposes. In support of that view he cited the high prices which pea-fattened sheep had recently brought in the Adelaide market. Lambs which, if left to pick what they could in the paddocks, would have realised only about 10s. a head had, thanks to the influence of the peas, brought up to 23s. 10d.

Mr. S. Ockley (Penola) said at present wool was the main object of the sheep-owner in the South-East, but when proper transit facilities were provided probably the carcass would be the principal aim. A neighbor of his for three or four years had been growing special feed with the idea of improving the wool production. He grew Algerian oats, and turned the lambing ewes in about May. The result was that he cut 2lb. more wool from the ewes than under ordinary conditions, and considered that the lambs were benefited to the extent of at least 2s. a head. He was able on the oats to lamb down 10 ewes to the acre. Estimating the increased quantity of wool to be worth 1s. a pound, and the enhanced value of the lambs at 2s. each, his return due to the oats worked out at £1 10s. an acre. The practice paid him well.

Mr. G. Jeffrey (Advisory Board) said the shearing depôt recommended itself very much to many farmers, and also to himself. He was not so satisfied, however, regarding the practicableness of the suggested wool depôts. The sentimental objection which Mr. Kilsby had referred to was important, and very real. Then there was the matter of the financial relations between some of the growers and the brokers. The latter lent the former money to keep them going on the understanding that they would receive the wool to sell, but if the depôt system should be adopted extensively one broker would get all of the wool and the others would be left out in the cold, a result which naturally would tend to diminish the readiness of the brokers to render the farmers financial assistance in their initial stages, thus hampering their progress.

Mr. Sassanowsky (Mount Gambier) thought that if the co-operative shearing should come into general vogue the depôt handling of wool would follow as a matter of course.

Mr. Jackson, in reply, contended that the grouping of the wools would not in any degree remove the spur to individual effort. Indeed, he believed the depôt system would rather develop the spirit of rivalry between the growers. Mr. Jeffrey's objection in respect to the brokers could be easily overcome by sending to the respective brokers in separate big lines the wools which previously had gone to them in small individual clips. Nothing affected the production of wool so much as feeding, and a glance at the staple would quickly reveal whether a sheep had been on good feed right through the season, or had received a check in any way. Careful experiments had demonstrated that peas had an appreciable effect in increasing the growth of wool. That might be explained to a certain extent by the fact that peas had a large nitrogen content, and wool also contained a big percentage of the same constituent.

IMPROVING PASTURES.

In a paper on this subject, contributed by Mr. S. Schinckel (Naracoorte), it was stated that the improving of pastures in the South-East was a matter of great importance to all landowners, and he thought many years would pass before any person could definitely say what would be the best course to pursue. There was no doubt, however, that some of the pasture lands could be considerably improved. He did not think their pastures received the attention they deserved. Often paddocks were heavily stocked (including rabbits) year in and year out. That course did not do justice to any pasture. Continuous heavy stocking reduced some of their most useful grasses by preventing them from seeding freely, and through soil exhaustion diminished their feeding value. Heavy stocking might increase the droppings of manure on the pastures, but that manure certainly did not compensate for the loss of seed, humus, &c., consumed by the stock. He asked them to think of

the quantity of food taken from the soil annually to build up the bone required by growing animals. Surely that was not all returned to the soil, seeing that fully 60 per cent. of the stock were slaughtered for local requirements or forwarded to market for disposal. Dairy cattle, too, removed a fairly large quantity of plant food from the soil in milk production. The separated milk usually went to young calves and pigs and was not returned to the soil. Less than 40 years ago nearly all the ridges on the open country north of Penola and around Naracoorte were covered with clovers and barley grass. Where were those clovers and barley grasses to-day? There could be only two or three answers to the question—overstocking and consequent lack of the required plant food, and robber weeds. To improve the pastures it was necessary to have convenient sized paddocks so that one might be only lightly stocked occasionally to allow of the provision of a good supply of seed and humus for the requirements of future years. Pastures could also be greatly improved by the sowing of suitable grasses. Though his experience was limited he gave rye grass and cocksfoot premier places. In that connection, however, experiments would be of considerable advantage, especially in view of the varied nature of the soils. Landowners might well co-operate and conduct experiments right through the district for the benefit of all. In sowing grasses some of the clover family should always be included, owing to their power of absorbing free nitrogen from the air, which must promote the growth of other grasses. To allow stock to keep the pastures bare year after year must rob the soil of humus, which was derived from the decay of vegetable matter. He had prepared in tabular form the results for four years of a few pasture manurial tests which he had conducted. The manures were drilled in on uncultivated land on May 18th, 1909. The table spoke for itself:—

Plot No.	Manures Used.	Position of Plots for Respective Years.			
		1909.	1910.	1911.	1912.
1	No manure.....	7th	7th	7th	7th
2	2cwts. mineral super.....	1st	1st	2nd	2nd
	1ewt. nitrate of soda.....				
	1ewt. sulphate of potash....				
3	2cwts. mineral super.....	3rd	4th	4th	4th
	1ewt. nitrate of soda.....	2nd	2nd	3rd	3rd
4	2cwts. mineral super.....				
	1ewt. sulphate of potash....				
5	1ewt. nitrate of soda.....	6th	6th	6th	6th
6	1ewt. sulphate of potash....	5th	5th	5th	5th
7	2cwts. mineral super.....	4th	3rd	1st	1st

Plot No. 2 gave the best results for the years 1909-10, but No. 7 gave better results in 1911 and 1912. That he could not understand, as No. 2 plot had been treated with a complete manure. He had the same experience with a complete manure in cereal crops, super. alone having given better results. Plots Nos. 5 and 6 were never much better than Plot No. 1, which had no

manure. Those manurial test plots, as well as others, convinced him that it was remunerative to treat at least some of the pasture lands liberally with superphosphate. The fertiliser greatly increased the growth of grass, and its effect on clovers was most marked. He asked any who might be doubtful, when sowing this season's crop, to put on 2cwts. of superphosphate for one width of the drill only, right through their field, and in two or three years they would be of the same opinion as himself. His advice was "Feed your land and it will feed your stock." All pasture should be kept free of weeds if possible, for they took food from the soil at the sacrifice of some more useful plant. In heavily timbered country, as far as finances would allow, all useless trees should be rung and all fallen useless logs and tops should be stacked and burnt. The ashes should not be left lying in heaps, but should be spread over the land. On land kept free from fallen timber it was much easier to check the rabbits, which should be vigorously kept down, as they not only consumed grasses, but greatly injured some of the most useful. Rough and scrubby country should be frequently burnt. That plan would keep the herbage much more succulent and tender. When crops had been removed all agricultural lands were used for pastoral purposes. He therefore strongly advised agriculturists to try, just for experiment, a few pounds of lucerne seed with the cereal crops at seeding time. Chou moullier had done remarkably well when sown with either wheat or oats, and he felt sure that that valuable plant would be largely grown in the South-East in the near future.

DELEGATES' EXPERIENCES.

Mr. S. Ockley (Penola) emphasized the importance of the subject to the South-East, where four-fifths of the area was devoted to grazing. Where wool was grown the pastures were getting worse each year. He had tried the effects of dressings of basic slag on pasture land and the result had been wonderful. It had stimulated the growth of clovers where previously there was none. These made excellent pasture for dairy cows. The manure, instead of increasing spindly grasses of lower feeding value, produced rich clovers.

Mr. Colebatch (B.Sc., M.R.C.V.S.) agreed that the question of pasture improvement was bound to be of paramount importance in a country like the South-East, where they depended so largely upon their pastoral lands. The conduct of manurial experiments was a difficult proposition, not to be lightly undertaken. He had seen Mr. Schinckel's creditable plots. The relative values of different treatments were described in the paper, but he understood the comparison was arrived at by gauging with the eye what each particular plot had produced. It was always contended by scientific men that results of manuring grass lands could not be estimated except by taking into consideration the composition and food value of the herbage. It was not a question of bulk. Under manurial treatment a new set of con-

ditions was set up, and it would be an unsafe comparison to assume that a ranker growth of coarse grass was the best, or that a lower growth of clover, etc., was inferior to it in feeding value. Nevertheless, he hoped Mr. Schinckel's tests would be continued. They noted that mineral super. was now coming out on top, and that the complete manure (nitrogen, super., and potash), after holding its own the first year, subsequently was placed second in the two following years. It might be that the mixed manure was stimulating clovers in preference to grasses. It was a pity that basic slag had not been tried, as where there was a heavy rainfall (25in. or over), or clayey soil, it would hold its own with super. There was more lime in the slag, and thus they got greater returns with leguminous plants. Mineral super. contained gypsum, but that was not so effective as pure lime. Clover seed would lie dormant in the ground for a long time under certain conditions, and he did not see any mystery in its germination when the soil was treated with the right fertiliser. In order to get the best results from accumulated droppings on the pastures he recommended systematic chain harrowing. This, with the application of light dressings of super. and basic slag, was sufficient for the ordinary farmer to undertake.

Mr. Nicholls congratulated Mr. Schinckel upon his experimental work. He said if the Agricultural Bureau was to make headway the Branches should encourage the carrying out of experiments. Local experience was often necessary to demonstrate the value of certain treatments, and the Branches were better for the purpose than the individual, as the encouragement they could give would make the experimenter feel the responsibility of continuing the work sufficiently long to establish the reliableness of the data gathered, and to reduce the margin of error to a minimum. The Department of Agriculture conducted experiments here and there, but it was only the farmers who could carry them out over extensive areas. Tests could be carried out at a cost of 2s. or 3s. per year, and with two or three days extra work. Serious work of this character provided opportunities for the Bureaus, and in the South-East, where many things could only be determined by practical tests carried out on the land in varying localities, Mr. Colebatch, he was sure, would be pleased to indicate lines of profitable research.

Mr. Kilsby (Mount Gambier) said the paper failed to state whether the outlay of 10s. or 12s. per acre had paid.

Mr. Colebatch explained that Mr. Schinckel's plots were small, and stock were kept off them. He was a pioneer at the work, which gave a rough idea of the relative merits of treatment. The real test would be to subdivide larger paddocks and feed them off with so many head at regular or irregular intervals.

Mr. W. P. Tucker (Kalangadoo) related how rye grass allowed to seed the first year in his district had died. Other rye, fed down, survived. In New Zealand and Gippsland it thickened after the first year by the germination

of shaken seed. Locally it went off gradually, leaving the land bare. He asked whether it would not be wise to harrow the seed in.

Mr. Colebatch thought a drag harrowing in autumn, to cover the seed between the established plants, would be helpful. The spells of heat after seeding often destroyed some of the seed, but there should be sufficient left, if covered by treatment with chain harrows, to germinate and strengthen the pasture in the way recorded in other parts of the world. If the seed was left uncovered it did not germinate till late, when it was eaten off by stock or perished from frost.

THE DAIRYING INDUSTRY.

Mr. P. H. Suter (Dairy Expert), reverting to the address which he gave at Quorn, said the men on the land were harboring cows that were responsible for an annual loss of more than £200,000. He contended that one of the main factors which contributed to that great loss was haphazard breeding. Heavy milkers were the result of a combination of great ancestral milkers. They could not expect all progeny to be as good as the dam; but by proper mating they could expect an improved average, as against the progeny of ordinary cows. If breeding meant anything it meant that the milking merits of the parent stock were transmitted to the heifer calves. The utmost care, therefore, should be exercised in selecting suitable sires to go with their cows. Hitherto that matter had received far too little consideration from cow-keepers. At auction sales cheap and nasty bulls were eagerly competed for at from £1 10s. to £3. To use such sires, which lacked milk-making blood, was a ruinous procedure, and it was largely owing to it that the present unsatisfactory position existed. It should be the ambition of every farmer to improve his stock, and that could be quickly effected by mating a special milking sire with the crossbred cows of the herd. Like beget like, and there was a world of truth in the old saying that "The bull is half of the herd." Taking a herd of 40 cows, the bull would transmit half the milk-making qualities to the offspring—that was one against 40. Assuming that 18 heifers were born, they would possess half the blood of the bull. In other words, the bull would influence the herd as much as the 40 cows, and would go on intensifying and increasing the improvement from generation to generation, and eventually the sire might be said to be the whole thing. A bad, cheap bull, or one of poor quality selected from within the herd, would do untold harm by reducing the milking productiveness of the future cows. On the other hand, a good bull, within a few years, would completely transform the herd and increase the quality and quantity of the milk. Such bulls as the latter had everywhere proved to be a royal road to success, and of great economy in building up herds, and those who had used them had clearly shown scrub-bred bulls to have been the dearest flesh on the farm. To employ "scrubbers" merely because they got calves was an offence, a dis-

grace to the dairy business of the State, and the best bid for failure a man could make. He was glad to state that during the last few years there had been a marked desire to effective improvement in the manner indicated, and he urged those still indifferent to carefully think the matter over. The value of a good bull could be illustrated thus : Grant that he made an improvement of, say, 50galls. during the lactation period of the heifer, at 5d. a gallon that would be equal to about 20s. per annum. Select 12 heifers from the calves dropped by the 40 cows, in six years' milking those would increase the returns by £72. Providing a man kept 40 cows, during four years he had the bull he would have a new herd ; and if the lifetime of each cow at the bucket was reckoned at six years, he would have an extra return of £240 in cash, and that simply because he had given his heifers one good parent. Putting the original price of the good bull at £15, and the interest for three years at £2 5s., there was a total outlay of £17 5s., compared with £5 15s. for an undesirable bull. That represented an extra expenditure of £11 10s. for the good animal. The one probably would give an increased return of £240 (for the extra outlay of £11 10s.), and the other a decreased return of £240, a difference of £480 in six years. Further, the prices obtained for any heifers sold would be higher in the case of those from the good bull. In the circumstances, he felt inclined to say that it was almost impossible for intending dairy farmers to pay too much for good bulls. Undesirable bulls, however, were the main stumbling-block to progress. His advice to them was that if they wished to practise economy they should begin anywhere rather than with the price paid for the bull. They should not treat quality in the sire with indifference, or be content to find that he was pure bred ; but they should carefully study the pedigree, and see that it disclosed blood lines full of milk right through his ancestors. A bull possessing such concentration of milk-making blood and individual merit was the surest means of perpetuation.

ELIMINATING THE WASTERS.

Of course the capacity and quality of the dam should not be overlooked in breeding for higher milk yields, while judicious feeding was also an important factor. Each cow should be properly tested. A testing outfit could be purchased for, say, £3, and the cost of arriving at the returns from each cow during the lactation period would not exceed 5s. per annum. Of two cows he had in mind, one gave 140lbs. of butter while the other produced 350lbs. That, at a shilling a pound, meant a difference between the returns of £10. If it cost £6 10s. a cow per annum the one left a profit of 10s., while that from the other amounted to £11. That example was applicable to scores of herds in South Australia. He wished it were otherwise. Farmers were looking too much to the factories as the markets for their products. They were the markets, in a sense, for the milk and the cream ; but the markets

for the green crops and grass were the cows. Where there were two factories the farmer would not send to the one which paid him least. Yet they found him persistently and contentedly feeding his produce to cows that were not returning the cost of growing the stuff, as well as to others that were showing handsome profits. Fancy the dairymen of South Australia working mornings and nights, Sundays and other days, and milking 50,000 cows and then losing money. Isaiah's question might well be asked there—"Wherefore do ye spend money for that which is not bread (or milk) and your labor for that which satisfieth not?" There were only two things to do—test the cows and mate good sires with the best of them. Under present conditions, with so many poor cows, it was easy to understand the talk about the drudgery of the dairying business. They should keep correct records of the respective milk yields and get rid of the charity boarders. Australians were not kindly disposed toward slavery, yet many, by following the cow, were unconsciously drifting into that condition. One remedy was the Babcock tester. The great failings of the worthless cows were concealed in the profits of the good ones, just as human idlers were a tax upon their energetic and thrifty fellows. By not keeping records, and thus not knowing the producing capacity of either, they were overrating the poor and underestimating the good animals. With the aid of illustrations, Mr. Suter described the internal structure of the udder of a cow, and explained how it was when roughly treated she was able to withhold her milk. He claimed that the far greater proportion of the milk given was made during the time of milking. In strange surroundings such as obtained at shows, many cows refused to secrete milk freely, and on that account he was not in favor of testing the cows entered for milk and butter production on the show grounds. The work should be done on the farm under ordinary conditions. The quantity of milk a cow would yield was affected by cruel treatment, improper feeding, and bad milking; but it depended more upon the inherent secreting capacity. If that were deficient good feeding would not count for much.

THE DISCUSSION.

Mr. S. Ockley commended dairying as a field for enterprise. There were two systems: the haphazard one of milking in slush and cold, or heat and dust; and the pleasant one of working with conveniences. He did not think it cost anything like £6 10s. a year to keep a cow unless it was stall fed. A number of cows were often kept as an adjunct on the farms, and were allowed to run on natural pasture, as it did not pay to leave idle a team of horses in order to feed them. No one sold good cows nowadays, and it took some time to breed them up. It would be a grand thing for the country if the Bureau Branches could make some arrangements with the Government to introduce bulls calculated to improve the herds into the country for their use. However, where lucerne and maize and similar fodders could be

grown like those exhibited there was nothing better than dairying. They were too far from market to sell their fodder, and feeding it to good cows offered profitable opportunities.

Mr. Kilsby asked what was the breed preferred by the expert, and why some cows were irregular in milk production--good one year and poor the next.

Mr. Suter said it was a matter of opinion, as much depended upon circumstances--rainfall, feed supplies, and climate. On good pastures, where there was also rye grass, clovers, &c., the Ayrshire or milking Shorthorn gave capital results. The Ayrshire-Shorthorn crosses also provided large-framed beasts that, when the owner desired, could be placed in back paddocks for fattening. The Jersey would do well under harder conditions, and he placed it as a dairy breed above all other kinds, with the exception of the other Channel Island breed, the Guernsey. For milk and butter production, providing climatic conditions were not too severe, either could be strongly recommended. One reason for irregularity in lacteal production was that farmers often milked their cows too close up to freshening time. They did not rest them sufficiently. They should try to spell good cows from six weeks to two months.

Mr. Sassanowsky agreed with Mr. Ockley that the cost of keeping a cow was overestimated. He thought statistics were not a reliable indication of the true condition of the dairy industry proper. Nine-tenths of the cows in the State were simply let run over ordinary farm lands. The average results did not reflect the progress made by the business-like dairyman. He asked whether it was a fact or not that a cow roughly handled and which had refused to give down its milk would make up for the deficiency by increase in the subsequent milking.

Mr. Suter, in reply, said the cow might give a little more than normal, but it would make little difference. His estimate of the cost of keeping a cow for 12 months was near the mark. Some farmers did not allow for the labor of their children, or the interest on capital.

SHEEP DIPPING.

A resolution "That sheep dipping be made compulsory" was withdrawn by the Naracoorte Branch. There was some discussion, in which a majority of delegates recognised the importance of dipping in the South-East for lice and tick.

THE NEXT CONFERENCE.

It was decided to hold the next conference at Millicent in 1914, subject to the consent of the Millicent delegates, who were unable to be present. Mount Gambier was named as an alternative.

Evening Session.**KYBYBOLITE EXPERIMENT FARM.**

Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S. (Manager of the Kybybolite Experiment Farm and Superintendent of Agriculture in the South-East), in the evening discussed the progress and development of the work on the farm. Two years ago, he said, he dealt with a somewhat similar topic, and he was pleased that he had been asked to speak on it again, for two reasons. One was that it indicated a live interest on the part of the farmers in the South-East in the labors at Kybybolite, and the other that it afforded him an opportunity to address representatives of the whole of the district and publish the results of his experiments. They were aware that at Kybybolite he was dealing with land typical of only a section of the South-Eastern country. Nevertheless, some of the principles applicable to that land applied also to different classes of soil subject to similar disabilities, chief among which was a surplus of water at certain times of the year. Generally, the soil at Kybybolite was of the character known as "rotten ironstone," but it was not so uncommon as some of them might imagine. Similar land was to be found in numerous other parts of the world. It seemed to be a feature of many of the clay lands subject to inundation that they should accumulate a large quantity of oxide of iron. Stiff yellow clay was the basis of a large proportion of the land at Kybybolite, and by the solvent action of the water some of the oxide of iron was drawn up and redeposited around the granules of sand in the upper layers of soil. Where a white cement or pipeclay layer came between the surface soil and the stiff subsoil below the oxide of iron had been leached out and had left it in that condition. Where that layer of material was fairly continuous right through they had the "spuey" characteristic in the most severe form. It was worthy of notice that that class of geological formation was found practically only in connection with soils deficient in lime. If there had been more lime at Kybybolite they would not have had that concretionary growth in the upper layer.

RAINFALL.

To enable them to obtain a better grip of the conditions under which the work at Kybybolite was performed he had prepared a table showing the rainfall each month since and including 1906, when the estate was opened up, and they would see what a glorious time the early settlers had had. In July of that year, for example, they had been favored with 9.35in. (Laughter, and "poor beggars.") The place was simply submerged with water and there were no drains to facilitate the flow. The total for the year was 36.97in. In 1910, a relatively wet season, they experienced 28.35in. The following year, which might be described as normal, the gauge showed 22.23in., and in 1912, the driest year on record, they registered only 20.83in. Although the precipitation in 1910 was heavy, the year was not a bad one

for the growth of crops. In February, 1911, they received 2·6lin. That was too much. Nice rains were experienced during the autumn and winter, but on September 27th they petered out. Dry conditions continued until December, when they had a useless fall of 3·47in. That accounted for the phenomenally low yields last year compared with those for the season just closed. There was no rain in January, 1912, only a few points in February, and practically nothing in March. Indeed, there was not a decent rain until June. Pleasingly light falls were recorded during the usually heavy rainy months of the year, then came the flood in September, and nice periodical rains through the finishing months of the crops' growth.

RAINFALL DISTRIBUTION, 1906-12.

Month.	1906. In.	1907. In.	1908. In.	1909. In.	1910. In.	1911. In.	1912. In.
January	·15	·27	·13	·76	·15	·71	·00
February	·45	1·46	·70	·62	·24	2·61	·14
March	1·65	·63	1·76	1·79	4·68	·85	·72
April	·60	3·98	·58	2·47	·87	1·11	1·51
May	4·00	2·73	3·54	2·24	3·75	2·63	·83
June	5·35	1·55	3·64	4·53	2·38	3·75	2·64
July	9·35	3·79	1·06	2·72	3·82	2·68	2·54
August	3·50	3·50	1·85	4·55	1·86	2·08	1·81
September	3·55	1·21	3·31	2·05	4·11	1·78	5·83
October	2·50	1·29	3·05	3·51	2·45	·79	1·10
November	4·21	1·93	·73	1·15	1·84	·00	1·97
December	·76	·73	·52	·47	2·20	3·34	1·74
Totals	36·07	23·07	20·87	27·86	28·35	22·23	20·83

EARLY SOWING.

It had been asserted that the rubbly ironstone land, of which a considerable proportion of the farm consisted, could not be ploughed until after a good rain. Yet during March and April last year he had the plough going steadily in a large paddock which had not been ploughed for two years. Of course the work had cost a little in shares, as new ones had to be put on every four or five days. As only the points had been worn, however, they came in later for wet ploughing. Seeing that they were right on the edge of the country where early sowing was essential—just as essential as it was in the Middle North—it was all-important that they should be able to plough during the period indicated. It did not pay them to fallow such large areas as in the North, because there was a good deal of growth on the stubble paddocks in the winter, and when the ploughing was done early it was often necessary to replough in the spring, as the land ran together in the winter. He was certain, however, that the settlers in the localities similar to Kybybolite could plough their land in March and April, and it would pay them handsomely to do so, if only they would go to a little more expense in shares.

GROWING GREENFEED.

With a view to secure greenfeed and ascertain what would best supply early keep for sheep, last year he sowed a paddock of 30 acres in strips with different classes of cereals. Rye occupied the largest area—15 acres. Other plots were devoted to rye, oats, and barley, in conjunction with half a bushel of vetches or tares to the acre. In the same paddock there was an acre of berseem (Egyptian clover) and early seedings of rape and rape and mustard. The paddock was ploughed up and sown in April. By the middle of May the only crop any good was the rye, which stood about 6in. high. The barley and oats appeared to be very sickly; the berseem could not be found, and the rape and mustard showed up only in odd patches. As the lambs were dropping the ewes had to be turned in. After a fairly hard feeding they were removed near the end of July. In the spring the oats shot away much quicker than anything else, and the conclusion therefore had been drawn that for early greenfeed to last through the spring equal parts of rye and Algerian oats would provide the most serviceable mixture. The berseem, where it got shelter, grew luxuriantly, but elsewhere it was poor. In the circumstances, as an autumn-sown crop for early feed, he could not recommend it.

Plot.	Per Acre.	Min. Super.	Sown.
		Per Acre. Cwts.	
1. Oats	2½ bush.	1½	April 8
2. { Oats	1½ bush.	1½	" 8
{ Tares	½ bush.		
3. Berseem	30lbs.	1½	" 12
4. Rape	5lbs.	1½	" 9
5. { Rape	3lbs.	1½	" 9
{ Mustard	1½lbs.		
6. { Barley	1½ bush.	1½	" 9
{ Tares	½ bush.		
7. { Rye	1½ bush.	1½	" 10
{ Tares	½ bush.		
8. Barley	2½ bush.	1½	" 10
9. Rye	2½ bush.	1½	" 11

THE HAY CROPS.

In the hay returns prepared he had not included anything which had not been sown for hay. In 1910 he tried some mixtures of wheat and oats, but they had not proved satisfactory. Of course, the results might be different under drainage conditions. In that season the best average return was 17cwts. from wheat and oats, while Dunn oats yielded 11cwts. In 1911, for the most part on crab-hole country, Algerian oats, which so far had given the best results for hay, averaged 2 tons 2cwts., whereas wheat and oats had returned only 15cwts. Last season Algerian oats yielded at the rate of 3 tons 1cwt., although the crop was lying all ways. From Calcutta oats he cut 2 tons 2cwts., and from Majestic wheat 1 ton 12cwts. The average for the whole farm was 2 tons 10cwts.

HAY RETURNS, 1910-12.

Season, 1910 ; rainfall, 28.35in.

	Acres.	Yield per Acre.			
		Tons.	Cwts.	Qrs.	lbs.
Oats	34.101 ..	0	11	0	23
Wheat and oats	67.882 ..	0	17	3	3
Rye and oats	4.152 ..	2	5	3	1
Totals	106.135 ..	0	16	3	1

Season, 1911 ; rainfall, 22.23in.

Oats	38.539 ..	2	2	1	11
Wheat	27.250 ..	1	4	2	23
Wheat and oats	28.250 ..	0	15	3	18
Totals	94.039 ..	1	9	0	28

Season, 1912 ; rainfall, 20.83in.

Oats, Algerian	14.468 ..	3	1	2	24
Oats, Calcutta	5.941 ..	2	2	0	23
Wheat	6.184 ..	1	12	3	24
Totals	26.593 ..	2	10	2	10

WHEAT RETURNS.

Although oats should be sown to the greatest extent in that class of country, nevertheless there was land which would grow good crops of wheat provided that it was drained and seeded at the right time. He had heard of yields up to 34bush. to the acre having been secured even with the header. With returns like that £3 2s. 6d. an acre was not a bit too much for the land. Unfortunately some farmers had obtained good yields from crops sown as late as the middle of July. They argued that there was no particular time to sow wheat, and that it was only a matter of luck when the yields were high. He did not think so. If a man wished to grow wheat successfully he must get it in early - before the end of May. The seed bed for wheat should be prepared more carefully than that which would suffice for oats. In 1910 Federation and Baroota Wonder, owing to a considerable part of the crop having been drowned out, yielded at the rate of only 5bush. 21lbs. and 5bush. 13lbs. respectively. These results showed what might be expected in a wet year without drains. The following year a large number of wheats were tried. Yandilla King came out on top, with a return of 21bush. 16lbs. Bordier (from New Zealand), a variety which stood up well, ripened about a week later than Federation, tillered and stooled well, and, although subject to rust, had never in his experience suffered to the extent of injured grain, averaged 19bush. 21lbs. Another New Zealand variety in Talavera gave 12bush. 45lbs. If they could rely upon returns in the neighborhood of 20bush. to the acre he was satisfied they would be able to grow wheat there at a profit. Last year the fallows were turned back in April, worked down, and sown during the last week in May and the first week in June. Bordier gave the capital return of 25bush.

7lbs., Federation 33bush. 29lbs., and Lott's 30bush. 20lbs. He desired to direct special attention to the yields from Lott's sown early (30bush.) and that sown late (20bush.). Notwithstanding that the season was particularly favorable for late sowing, and although only a month separated the two sowings, there had been a difference of 10bush., which at 3s. 3d. a bushel equalled more than 30s. an acre in favor of the early sown wheat. To get the fullest benefit from the drains they must seed early, so that the plants would become established before the heavy rains set in.

WHEAT RETURNS, 1910-13.

Season, 1910-11.

	Acres.	Yield per Acre.	
		Bush.	lbs.
Federation.....	10 ..	5	21
Baroota Wonder	5 ..	5	13
Totals.....	15 ..	5	19

Season, 1911-12.

Yandilla King.....	651 ..	21	16
Bordier	3-761 ..	19	2
Federation.....	754 ..	15	35
Gallant.....	2-921 ..	13	39
Talavera	3-009 ..	12	45
Majestic	2-890 ..	10	14
Huguenot	3-168 ..	8	43
Totals.....	17-154 ..	13	34

Season, 1912-13.

Federation.....	2-101 ..	33	20
Lott's	1-805 ..	30	20
Clubhead	1-823 ..	29	51
Bayah	1-163 ..	29	36
Yandilla King.....	5-964 ..	28	16
White Tuscan (N.)	1-176 ..	27	32
Talavera	1-792 ..	27	5
Dart's Imperial	1-756 ..	27	1
Majestic	1-783 ..	26	16
Gallant.....	1-820 ..	25	27
White Tuscan (S.)	1-952 ..	25	20
Bordier	26-826 ..	25	7
Marshall's No. 3	2-043 ..	24	45
Baroota Wonder	2-000 ..	22	27
Huguenot	1-306 ..	20	27
Golden Drop	1-739 ..	17	36
Totals.....	56-958 ..	25	56

Late Sown Wheats.

Lott's	4-277 ..	20	8
Gallant.....	10-680 ..	17	24
Talavera	10-000 ..	12	45
Totals.....	24-957 ..	16	0
Grand totals	81-915 ..	22	54

BARLEY.

When first he went to Kybybolite he sowed barley in the autumn. Now he was sowing it practically in the winter. It was necessary as far as possible to ease the work at seeding time. If they could grow anything like a crop by sowing in August then it would pay them well to defer the barley seeding until then. Last season he put the whole of the barley paddock in in that month. Harvesting operations had not yet been completed, but one-half of the paddock which he had worked out had returned 40bush. to the acre. That was surely a feather in the cap of the land. With the barley he tried several different fertilisers. Wherever nitrogen was applied in the presence of a large quantity of phosphoric acid it seemed to send the crop to too much flag and had tended to reduce the ultimate yield. On the other hand, where practically no nitrogen was used the results had been better.

BARLEY RETURNS, 1910-13.

Season, 1910-11, Cape Barley	3bush. 0lbs. per acre
" 1911-12 "	9bush. 20lbs. per acre
" 1912-13 "	40bush. (approx.)

TRIAL OF PHOSPHATIC MANURES ON CAPE BARLEY.

Seed sown first week in August, 2bush. per acre.

	Area in Acres.	Yield per Acre.	
		Bush.	lbs.
S.A. super	·535	35	31
Slag and super.	·562	33	42
Bone and super No. 1	·568	33	7
Bone and super. No. 2	·538	32	19
Basic slag	·532	31	44
Nitro-super.	·538	31	35
Dissolved bones	·612	29	11
Hashmagandy	1·177	20	13
Guano-super.	·562	25	17

OATS.

The oats last season were sown in a paddock which he had ploughed dry in March and April. The land was worked dry and the unpickled seed was sown dry, yet they had one of the cleanest crops of oats he had ever seen. He did not think that the return of 32bush. was to be credited entirely to the drains, but was convinced that when they had a wet season the yield would be nearer the 32bush. mark than it would if there were no drains. He was encouraged in that view by the fact that in 1910 and 1911, prior to the construction of the drains around that paddock, the returns averaged only about 3bush. and 13bush. respectively. The latest yield would have been nearly 40bush. had it not been for the grubs. The scheme for sowing which he had mapped out was as follows:—The sowing for greenfeed was begun not later than March. In April, so soon as the land was ready, and irrespective of rain, the oats were put in with the idea of using the crop either for early hay or greenfeed. At the end of April a start was made with the wheats,

and when that work was finished the sowing of the oats was resumed. At the end of June the peas and beans were put in, and in July and August attention was given to the barley and mangolds. He strongly advised the farmers to risk dry seeding with oats and to go in as much as possible for mixed farming.

OAT RETURNS, 1910-13.

Season, 1910-11,	Algerian oats	13bush. 0lbs. per acre
" 1911-12	"	13bush. 24lbs. per acre
" 1912-13	"	30bush. (approx.)

FALLOWING.

On his experience to date he had come to the conclusion that in fallowing the best plan was to plough once and let the land lie until the time came to work it over preparatory to seeding. Some farmers worked their land down as fine as mustard, with the result that after every shower it set down hard, and, moreover, excessive working favored the development of takeall. With the object of elucidating some of the problems connected with fallowing he had planned a series of tests to extend over a number of years, which would include autumn, winter, spring, and summer fallowing.

SCHEME FOR DETERMINING RELATIVE MERITS OF DIFFERENT FALLOWING SYSTEMS.

SEED—Algerian oats, 1½ bush. per acre.		MANURE—36/38 min. super., 1cwt. per acre.	
Plot.		Plot.	
1	Buffer area	{ 16	No other cultivation
{ 2	Alternate cropping without	{ 17	
3	fallowing	{ 18	Cultivated in spring
{ 4	No other cultivation	{ 19	Cultivated in spring and
5		{ 20	summer
Autumn fallows { 6	Cultivated in spring	{ 21	
{ 7	Cultivated in spring and	{ 22	No other cultivation
8	and summer	{ 23	
Winter fallows { 9		{ 24	Cultivated in summer
{ 10 & 11	No other cultivation	{ 25	
{ 12 & 13	Cultivated in spring	{ 26	Cropped every year
{ 14 & 15	Cultivated in spring and summer	{ 27	Buffer area

QUANTITATIVE MANURIAL TESTS.

Quantitative manurial experiments which he had been conducting for three years indicated that up to 1cwt. of superphosphate could be applied profitably. It might be profitable to apply even a heavier dressing at the expense of the immediate crop in order to secure the fertility sought, but to him it seemed that on that class of country, which they had not yet succeeded in sweetening, it would not pay a man to invest his capital in the land in the form of stored up superphosphate at the expense of the crop he was growing. Particularly would that apply to struggling settlers who were after every shekel. They would be wiser to restrict themselves to light dressings, even at the risk of the

lowering of the fertility to some extent, so that when they attained a decent position they would be able to apply heavier dressings and make up the fertility lost during the sweetening process.

QUANTITATIVE MANURIAL TRIAL, 1910-13.

SEED—Algerian oats, $1\frac{1}{2}$ bush. per acre.

MANURE—36/38 mineral super.

	$\frac{1}{2}$ cwt.		1 cwt.		$1\frac{1}{2}$ cwt.		2 cwt.		3 cwt.	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
1910-11	12	33	14	24	12	21	8	10	—	—
1911-12	8	14	15	14	14	34	13	22	12	34
1912-13	24	23	25	16	25	21	24	25	26	20

NITRATE OF LIME AS A STIMULATOR.

To see if it would be possible to stimulate the late-sown wheats last season sufficiently to enable them to catch up to those sown earlier, he applied light dressings of nitrate of lime sent down by the Director of Agriculture (Professor Lowrie). The returns showed that, whereas the untreated plot yielded 17 bush. to the acre, that dressed with 28 lbs. to the acre gave only 15 bush., that helped with 56 lbs. 17 bush., that treated with 84 lbs. 19 bush., and stimulated with 1 cwt. only 16 bush. Although he could not draw any definite conclusion from those results for one year, on the surface it did not appear that the application of nitrate of lime would prove to be a paying proposition.

TOP DRESSING EXPERIMENT, 1912-13.

SEED—Gallant wheat, July sown, 1 bush. per acre, with $1\frac{1}{2}$ cwt. 36/38 mineral super.

MANURE FOR TOP DRESSING—Nitrate of lime; applied in August.

	Area in Acres.	Yield per Acre.	
		Bush.	lbs.
1. No spring dressing	3.557	17	50
2. $\frac{1}{2}$ cwt. per acre	1.792	15	46
3. $\frac{1}{2}$ cwt. per acre	1.843	17	39
4. $\frac{3}{4}$ cwt. per acre	1.744	19	10
5. 1 cwt. per acre	1.744	16	8

SORREL.

In conclusion, Mr. Colebatch described the results of investigations conducted at Rothamstead during 1862-1903 into the effects of various fertilisers upon sorrel. On an unmanured plot the sorrel showed a steady increase from 1.40 per cent. to 2.21 per cent. A plot dressed with $3\frac{1}{2}$ cwt. of superphosphate carried 3.94 per cent. of sorrel in 1862 and 3.37 per cent. in 1877. Then a dressing of lime was applied, and in 1903 there was only 1.51 per cent. of the weed apparent. Heavy dressings of ammonium salts caused an enormous increase in the growth of the sorrel, until in 1867 there was 24.27 per cent. in evidence. Then that dressing was discontinued and one consisting of $3\frac{1}{2}$ cwt. of superphosphate, 500 lbs. of sulphate of potash, 100 lbs. of sulphate of soda, and 100 lbs. of sulphate of magnesia was used.

The result was that by 1877 the sorrel had diminished to 7.66 per cent., and dressings of lime still further reduced it to 5.24 per cent. in 1903. On another plot, under the influence of applications of 400lbs. of ammonium salts, the sorrel advanced from 9.15 per cent. in 1862 to 15.94 per cent. By 1877, however, the percentage had fallen to 2.13 per cent., thus showing that too much acid in the soil reacted to the detriment of the sorrel. In 1897 the experiment was abandoned, with the result that the growth of the weed rapidly increased, and in 1903 it reached 14.84 per cent. Sorrel was prevalent in many parts of the South-East, especially on the light lands. He had it at Kybybolite. At Glenburnie they had been conducting some experiments to ascertain the value of lime in combating the pest. The results so far had been most striking in its favor. Apart from the application of lime, there were two ways of treating land on which sorrell was growing. One was to cultivate in the summer and thus kill the weed gradually, and the other was to plough the land up fairly deep in June and July and sow some crop like peas and spring barley calculated to get a good start on the sorrel, which did not make any headway in winter. He was satisfied that in the profitable utilisation of a large proportion of the land in the South-East the two principal agencies were going to be drainage and lime. He believed that the time was coming when they all would be as familiar with lime distributors as with the ordinary farm drill.

Mr. G. F. Cleland (member of the Advisory Board) said they had listened to an interesting and able address. Men like Mr. Colebatch were going to do big things for agriculture in South Australia.

Mr. R. Fowler (Fruit Inspector in the South-East), referring to the sorrel experiments at Glenburnie, said that where the land had been dressed with 5cwt. of lime to the acre there was 80 per cent. less sorrel than where the gypsum had been applied.

Mr. Colebatch, in answer to an inquiry, mentioned that the mole drain-plough had been tried at Kybybolite, but not with any degree of success. It worked satisfactorily where the clay subsoil was continuous, but when it passed through shingle patches the channel cut closed up again. Tile drains would not pay. The open drains which he made cost 6d. per chain, but the farmers could make them for about 6d. a mile.

AFFORESTATION.

Mr. W. Gill (Conservator of Forests) read a paper on "Afforestation," as follows:—"With regard to the question of afforestation, the people in this State, speaking in general terms, may be divided into two sections, one consisting of those residing in treeless districts emphatically in favor of planting and conserving trees, the other comprising those who live in forest or timbered country and desire to clear the land of timber. So we find that some think the timber question one of considerable importance, while others think it

none of their business. One point, however, which it will be our special business to emphasize this evening is that the question of afforesting timberless land and reforesting lands once fully timbered is everybody's business, and not the concern of one section of the community alone. A simple analysis of the timber consumption will speedily establish the accuracy of this contention. To begin with, we will analyse the consumption of matches. Generally speaking, everybody uses matches, with but few exceptions, and when we inquire what quantity of timber is consumed in the match-making industry we find that the consumption is enormous. Not only so, but the quality of the wood used is the best. Nothing but best splitting wood, free absolutely from knots or any defect, will do. Of the hundreds of factories in America, for instance, one on the Pacific Coast covers 240 acres, and has 32 miles of railroad which supply the match machines with 200,000ft. of sugar and yellow pine logs a day. As regards the rate at which they can be made, a single machine has been known to turn out 177,926,400 matches in one day, boxed and labelled ready for shipment. Such rapid consumption is daily telling on the timber supply in America, and it is a much more serious problem in some European countries than it is there.

EVERYBODY CONCERNED.

"Every person who ever uses an axe is concerned in the timber question, because he needs axe handles, and the supply of suitable timber for ash handles is fast becoming exhausted in America, and also here. Proof of this exists in the fact that we are now paying 1s. 1d. for an ash axe handle which only a few years ago could be bought for 10d. Again, the farmer and everyone occupying the land is largely concerned in the question of maintaining a supply of timber, as timber of various kinds for wheels, framing of drays, wagons, and agricultural implements, tool handles, &c., is constantly rising in price as it becomes scarcer in the various producing centres of the world. Buggy poles, for instance, are now far more costly than they were a few years ago, while within the last year or two it has been exceedingly difficult to obtain good seasoned felloes for wheel-making, so scarce has the best timber for the purpose—our South Australian bluegum (*Eucalyptus leucorylon*)—become. The man in the street, in common with everyone else who reads the 'dailies,' is affected when the timber supply decreases, because trees form one of the main sources of material for paper-making, and the use of the timber for making paper pulp, though of comparatively recent growth, has proved a most exhausting factor in devouring hundreds of thousands of acres of trees year after year. An incident often quoted (the significance of which is, however, never exhausted) is that of the trial made in Austria on one occasion to see how soon living trees could be turned into paper. At Elsenthal one morning, at 7.35, three trees were sawn down; at 9.34 the wood, which had been stripped of bark, cut up and converted

into pulp, became paper and passed from the factory to the press, and the first printed and folded copy was issued at 10 o'clock, so that in 145 minutes the trees had become newspapers. The consumption of wood for pulp is vividly pictured when we hear that the average circulation of a popular daily halfpenny paper requires 200 trees for pulp. What stronger proof is required as to the rapidity with which trees are being destroyed? Many more facts might be cited, but sufficient has been said to show that hardly a single individual can be found who in some way or other is not constantly benefited by trees. We build our houses of wood from trees; we ride in vehicles, cars, coaches, railway carriages made from wood; we warm ourselves and cook our food largely with firewood; we get out fruit from trees; our furniture is made from every conceivable variety of wood from trees; all the thousand and one articles of commerce which we daily purchase are sent across the sea or transported from one place to another in cases made from wood. Turn where you will, go where you may, you cannot escape from the continuous demand for wood in some way or other. All are more or less under obligation to the forest for benefits received, and that obligation can only be rightly repaid when every individual in the State makes it his or her business to plant trees, or in some way assist others to plant them.

NEED FOR PLANTING.

"The need is great indeed for planting. Every axe at work in the forests of the world to-day lessens the world's timber supply; every scream of the engine whistle, as it echoes and re-echoes through the lofty colonnades of the mighty monarchs of the forest, summons thousands of mill hands to their daily task of converting hundreds of thousands of logs into millions of feet of dressed lumber, while hundreds of ships are daily crossing the ocean laden with millions of feet of timber of all kinds. The incessant strain of such ceaseless demands can have but one effect; that effect was graphically indicated by ex-President Roosevelt on one occasion, when he said to a conference of American foresters. 'If the present rate of forest destruction is allowed to continue without anything to off-set it, a timber famine in the near future is inevitable, and it is difficult to imagine what such a timber famine would mean to our national resources, for there is a steadily increasing demand for wood even in our manufacturing industries.' Fortunately, the Americans have given heed to this advice, with the result that a strong movement in favor of forest conservation has been developed all through the States, and steps are being taken in all directions to treat this highly important question in a rational and progressive manner. As a consequence of this energetic departure the gross area under forests has been increased from under 10,000,000 acres 10 years ago to 192,931,197 acres to-day. Numerous schools for the training of foresters have been started, and numbers of well-trained intelligent foresters are now employed, both in private and State

forests. Under their capable guidance the outlook of American forestry is daily assuming a more cheerful and encouraging character. Forestry associations have been formed all over the States, and vigorous steps are being taken in every direction to champion the cause of forestry, rightly conserving the forests by wise use of what is mature for the axe and protecting what is young and immature in order that it, too, in due course, may fulfil its part in supplying the constant demand for timber. Conservation does not mean keeping trees to look at, but so limiting the amount of timber removed in such a systematic manner as to preserve a proper balance between consumption and growth; using only what Nature annually develops and leaving the main forest capital intact.

AUSTRALIAN ACTION.

"It may be fitting here to mention that at the Conference of Heads of the Forest Departments of the various States held in Sydney in November, 1911, a resolution was carried unanimously that associations similar to those in America should be formed in these States. As a result, forest leagues have been formed in New South Wales, Victoria, and Tasmania, and steps are now being taken to follow that good example in this State. The forests of a country belong to the people, not to any special clique or class or locality, and should undoubtedly be administered for the benefit of the people as a whole, and not in the interest of any particular district; for, as has already been observed, forestry is everybody's business. Those of us who have spent our lives in the careful study of trees and their requirements for profitable production are willing to do all in our power to fully develop the forest wealth of the States; but we earnestly desire and hope for a fuller measure of encouragement and attention from the nation than this infinitely important matter has ever received.

OPERATIONS IN SOUTH AUSTRALIA.

"You will now naturally ask—What progress has been made in South Australia with forest work? Full details are out of place just here, but, briefly summarising, it may be stated that the Forest Department has had a chequered career during the 36 years of its existence. The flag has been kept flying, however, in spite of many obstacles, and it seems not too much to hope, judging from the greater interest now shown in forestry in many quarters where it was at one time entirely ignored, that a brighter day has dawned—a day that will help the cause of forestry to flourish under the encouraging smile of an enlightened public opinion, instead of struggling under the blighting influence of indifference. The area of the reserves on June 30th, 1912, was 161,000 acres. The area planted was, in round numbers,

10,200 ; of this approximately 6,400 acres carrying eucalypts or hardwoods, 2,800 carrying pines, and 1,000 are under firebreaks, which also serve as roadways. Nearly all the gums of any value from the other States at all likely to succeed here have been tried. The narrow-leaved ironbark (*Eucalyptus crebra*), the Victorian ironbark (*Eucalyptus sideroxylon*), the leather jacket (*Eucalyptus punctata*), have shown ready adaptability to various sites, others require still further observation ere a decided opinion can be formed, and others again, such as the jarrah (*Eucalyptus marginata*), the karri (*Eucalyptus diversifolia*), the tooart (*Eucalyptus gomphocephala*), the yate gum (*Eucalyptus cornuta*), have proved unsuited for timber growing under our conditions of climate and soil.

WORLD'S RECORD BROKEN.

"Some of the best known pines of commerce require other conditions of climate and soil than those obtainable here ; but the Aleppo pine (*Pinus halepensis*), the maritime pine (*Pinus maritima*), the stone pine (*Pinus pinea*), the Canary Island pine (*Pinus canariensis*), the Corsican pine (*Pinus laricio*), and the Remarkable pine (*Pinus insignis*), have all been successfully acclimatised. Of these, the last, the Remarkable pine, has beaten the world's record for plantation grown pines in the rapidity and volume of its production, as it has grown faster than the quickest growing pine in Germany, where records have been kept over a long series of years. These records show that it would take 60 years to grow the quantity of timber per acre (6,000 cubic ft.) which recent measurements prove was grown over an area of $5\frac{1}{2}$ acres in Bundaleer forest in 26 years. The Remarkable pine produces double the quantity of merchantable timber per acre that the others do, and is therefore more largely planted, though the latter will sometimes succeed when the Remarkable pine will not. The wood of this pine, though at one time the subject of bitter prejudice, the result of ignorance of its quality, has proved itself for some purposes, especially case-making, superior to any other on the market when grown properly for timber production ; but when just grown anyhow, singly or in widely-spaced clumps or rows, it has turned out too coarse and knotty for most purposes, which is just what a trained forester would expect. Already from the Wirrabara forest 140,000 cases have been sold during the nine years the mill has been working there, and all have been made from *Pinus insignis* grown there by the department in from 20 to 30 years. The quality of the timber has been of high character, and given every satisfaction to the purchasers, while the amount received, £4,588, has left a satisfactory return of revenue after allowing for all expenses. To encourage private planting the department has issued over 8,000,000 trees during the last 30 years gratis. Where these have been rightly used towns have been beautified, homes have been ornamented, stock have been sheltered,

and wood for private use has been produced ; but where this privilege has been abused and the trees wasted, as has too often been the case, loss has ensued, not only to the individual, but to the State, as it costs at least £2,000 per annum to grow and issue the trees. The expenditure for the 36 years has been £271,188, and revenue £174,340, leaving a balance of £96,848 ; but it must be remembered that over £60,000 has been spent growing trees which have been given away, and for which no credit has been passed. Had they been sold at a fair price the debit balance would have disappeared. As it is, however, the trees in the plantations are daily growing into money, and form an ample offset against the expenditure. Owing to the more generous vote enjoyed during the last few years, the planting area has been about 1,000 acres a year, and, in addition to planting, operations are in progress which will ultimately provide our valuable stringybark forests in the South-East with a system of firebreaks which will protect the young saplings coming from seed spontaneously to regenerate the forest to such an extent as to reduce the risk of fire to the minimum, and the completion of this may involve for a time the planting of a lesser area. The labor will be amply repaid, however, if we can succeed in the developing from the millions of young trees which come up a forest equal to the valuable timber already produced in these forests, the excellence of which is so well known locally.

THE FIRE FIEND.

“ But while every possible effort is being made to preserve our young forests and plantations from the greatest enemy they have to dread all over the world, viz., fire, we feel called upon to enlist the sympathy and aid of the public in contending against the constant breaches of the Fire Act which occur in many districts, and against that vilest of all felonies, the act of the incendiary. The practice known as ‘ patching,’ or burning coarse grass, bushes, and other rough vegetation in order to sweeten the land and produce better feed, which prevails in so many districts, is responsible for many a severe loss to neighbors, who have no chance whatever to recoup it. Now, though this work may be right enough where carefully carried out, it is a work which cannot be condemned too strongly when practised, as it so often is, without the least regard to the provisions of the Fire Act. It seems incredible that in this enlightened age any man should be so dead to all consideration for the rights of others as to deliberately ignore the laws which have been enacted to ensure protection from injury to all alike, and to fire the country for his own aggrandisement without making any provision to properly control it, and thus be the source of untold misery to others when ultimately it spreads loss and devastation little dreamed of. In this way only lately, near Lake Leake, in the hundred of Riddoch, a settler just getting on his legs was burnt out ‘ rump and stump ’ and left utterly without recompense to make a fresh

start. Are we less civilised than the old Romans of over a thousand years ago, of whom Macaulay wrote so finely—

Then none was for a party,
Then all were for the State,
Then the great man helped the poor,
And the poor man loved the great;
Then lands were fairly portioned,
Then spoils were fairly sold:
The Romans were like brothers
In the brave days of old.

Is there no fine sense of justice which will yet lead men to 'do unto others as they would that men should do unto them'? If so, then we must seek the aid of an enlightened public opinion in making laws drastic enough to check this wanton defiance of justice. But if the practice of illegally firing the country be highly reprehensible, as it undoubtedly is, what shall we say of the act of the man who with deliberate malice aforethought sets fire to the country in revenge for some real or fancied wrong? We say deliberately and emphatically that such a man is practically a murderer, for how can he tell the awful disasters which may follow in the wake of his diabolical work? Quite fresh in the memory of some of us is the terrible occurrence in connection with the fire that burned over such a large tract of country between Port Victor and Willunga. A poor woman, whose business compelled her to be absent from home for a time, locked up her house, in which she left her two little children, expecting soon to return, but during her absence an avalanche of flame swept over the whole district and roasted the two innocents to death. During another fire, between the Meadows and Echunga, the damage by which was estimated at £200,000, a little girl and her dog were saved from a similar terrible fate only by rushing under a culvert and there remaining till the death-dealing conflagration had passed, devastating all before it. A man was actually seen at one place lighting this fire, though he unfortunately escaped capture. Is it not obvious that once a man has let loose the fire demon he knows not the dreadful possibilities it may possess? About two years ago an extensive fire, lit by some irresponsible person in defiance of the Fire Act, destroyed hundreds of thousands of saplings in our forest a few miles from here, and last season an act of incendiarism took place at the south end of the reserve; and it was only with much difficulty that loss was prevented, and though a black tracker was sent to try and discover the perpetrator of this dastardly act, he was unhappily unsuccessful. It is evident, therefore, that it is necessary to create, if possible, a healthy public spirit of opposition to these heartless and disastrous practices. An incendiary is dead to all feeling of right, lost to all sense of fair play, permeated by the spirit of the foul fiend himself—a dark and gruesome blot on the fair escutcheon of this glorious country of ours which ought to be removed. Of

him it may well be said, in the stirring words of the great poet, Sir Walter Scott -

That wretch, concentrated all in self,
Living shall forfeit fair renown,
And doubly dying shall go down
To the vile dust from whence he sprung,
Unwept, unhonoured, and unsung."

The Chairman and Mr. G. F. Cleland complimented the lecturer upon his excellent address. Mr. Cleland pointed out that the question of afforestation was one of national importance, and it was to be hoped that Parliament would recognise the merit of the work of the Forestry Department by increased liberality in the annual vote. (Applause).

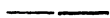
VOTES OF THANKS.

At the instance of Mr. L. W. Peake, votes of thanks were accorded to the Minister of Agriculture, the Officers of the Department, the Members of the Advisory Board, and those who had contributed papers.

The Minister, in responding, said it had been gratifying to him to visit Penola, and to find them so hopeful. He was glad that Mr. Colebatch had spoken more optimistically than on a similar occasion two years ago regarding the work at Kybybolite. It was evident that he had started out on the right lines, and he (the speaker) believed that he was in a fair way to solve the problem of the successful occupation of the South-East. There was no doubt that he had abundantly justified his appointment as manager of the Kybybolite Farm and Superintendent of Agriculture in the South-East. Every officer of the Agriculture Department was an enthusiast, and considered that his particular branch was the one upon which the future success of the State depended. That was the right spirit, and he hoped it would long continue. (Hear, hear).



CONFERENCE OF NORTHERN BRANCHES.



The Annual Conference of Northern Branches of the Agricultural Bureau was held at the Institute, Saddleworth, on the 27th March. The Department of Agriculture was represented by the Hon. T. Pascoe, M.L.C. (Minister of Agriculture and Irrigation), Messrs. W. Lowrie M.A., B.Sc. (Director of Agriculture), Geo. Quinn (Horticultural Instructor), F. E. Place, B.V.Sc., M.R.C.V.S. (Government Veterinary Lecturer), and H. Jackson (Wool Instructor, School of Mines). The Advisory Board members present were

Messrs. A. M. Dawkins, G. Jeffrey, C. E. Birks, and F. Coleman, and G. G. Nicholls (secretary). In addition to a number of visitors, the undermentioned gentlemen attended as delegates from the following Branches:—Gladstone—Mr. R. E. Lines; Saddleworth—Messrs. W. Scales, R. G. Townsend; Freeling—Mr. A. J. Kuhlmann; Riverton—Messrs. E. A. Gray, J. P. Schultz, W. B. Davis, H. A. Davis, R. Wilkinson; Gawler River—Messrs. A. J. Davis, W. J. Dawkins, C. V. Leak, J. H. Dawkins; Redhill—Messrs. F. H. Wheaton, E. Steele; Clare—Mr. B. Lloyd; Salisbury—Mr. E. Moss; Mallala—Messrs. A. V. Nairn, J. L. Curnow, A. E. Temby, M. P. McCabe, J. Nairne; Whyte-Yarcowie—Messrs. E. J. Pearce, G. F. Jenkins; Georgetown—Messrs. W. A. Hill, M. J. McAuley, M. Bond, G. Read, S. Eyre, J. Wyatt; Port Pirie—Messrs. A. M. Laurie, T. B. Jose; Crystal Brook—Mr. M. P. Pavy; Blyth—Messrs. C. H. Zweck, W. O. Eime; Yongala Vale—Messrs. C. Fowler, G. Lloyd.

CHAIRMAN'S ADDRESS.

The President of the local Branch (Mr. P. Manning), in extending a hearty welcome to the departmental officers and visiting delegates, said the opportunity of hearing addresses from expert men on agricultural subjects was not to be neglected. He paid a tribute to the value of the Agricultural Bureau as a means of bringing the scientists and farmers together to discuss the various problems with which they were faced, expressing the opinion that this interchange of ideas was productive of considerable benefit.

MINISTER'S OPENING ADDRESS.

The Minister of Agriculture expressed his pleasure in being present at the Conference, especially as he had attended previous gatherings of the Northern Branches as a delegate from the Whyte-Yarcowie Bureau. During the year he had added the names of two gentlemen to the membership of the Advisory Board of Agriculture, viz., Messrs. F. Coleman and C. E. Birks, because he had felt it necessary that the farming interests should be adequately represented on the Board. Both these gentlemen were present, and if farmers generally in South Australia emulated the practical work being carried out by them the standard of farming in the State would never go back.

DEPARTMENTAL ADMINISTRATION.

With regard to the administration of the Agricultural Department he had an important announcement to make, and he was glad that he was able to take a gathering of members of the Bureau into his confidence first. That which he had to say particularly affected this district. The districts represented at the Conference, extending from Gawler River in the south up to Crystal Brook and Whyte-Yarcowie in the north, constituted what were known as the safe agricultural areas north of Adelaide, and in no other part of the State had the standard of farming reached a higher state of efficiency than here.

EXPERIMENTAL FARMS.

They had had experimental farms at Roseworthy, Parafield, Kybybolite, Turretfield, Veitch's Well, Loxton, Shannon, Booborowie, and Minburra, and poultry stations at Roseworthy, Murray Bridge, and Kybybolite. In addition to these there were various experimental plots conducted by private individuals, under the direction of the department. The feeling had therefore developed in his mind that the efforts of the officers were too widely extended to ensure proper supervision, with the result that several of the farms were not accomplishing one of their most important objects, *i.e.*, proving what all farms should, financial successes. In other words, the operations were too scattered to be of the fullest use and advantage to the farming community and to the State itself. Those farms had been called experimental farms. It was not every man who might be a capable farmer who was a successful experimentalist. Indeed, it was given to few men to be thoroughly successful in that direction. It was not surprising therefore that the department had experienced great difficulty in effectively filling the positions of managers of the experimental farms. He had decided that it would be a wise step to concentrate the efforts of the department by closing down some of the places. Three years ago there were three Government farms in the Loxton country within a comparatively short distance of each other— one at Loxton, another at Veitch's Well, and a third at Schell's Well. When previously in office he closed the last-named, and recently he had dispensed with that at Loxton, which comprised 600 acres of land on the river bank similar in character to that at Veitch's Well. He was satisfied that by concentrating the work of the manager on the latter property the results obtained would be much more satisfactory and valuable than they possibly could be when divided between the two farms. Another farm which they had resolved to shut down was that at Shannon, on Eyre's Peninsula, which had consisted of an area of 1,168 acres. The land there was not typical of the great area of West Coast country which it was proposed to open up, and the treatment required would be largely different. Should such a course be desirable in the future a farm could be established in more typical country.

MINBURRA.

The Minburra farm had been established purely for experimental purposes. The work there had been disappointing in the extreme, better work of the kind was being done by private persons. When he previously occupied office he had been responsible for the establishment of this farm, but on his return he came to the conclusion that no good purpose could be served by continuing operations. Twelve months' notice had been given to the owners, and at the end of that period the Government work there would cease. A similar policy had been adopted in connection with the poultry stations.

POULTRY STATIONS.

The dual control at the stations had not been satisfactory, and the Poultry Expert (Mr. D. F. Laurie) had indicated that if he could concentrate his efforts at a central station better results could be secured. Consequently, it had been agreed to do the whole of the work at Parafield, and to transfer to Turretfield the wheat-growing formerly carried on there. Parafield had to be closed because it was far too small to be an economical success from a farming standpoint. He realised that farmers generally were not likely systematically to engage in the poultry industry, as they regarded it merely as an auxiliary to the farm to be managed by the wives and daughters. However, there were many men round the city holding small areas who were deeply interested. It would be advantageous to them to have the poultry station near Adelaide.

TURRETFIELD.

At Turretfield it was proposed to conduct experiments which would be an object lesson, particularly to farmers in the safe districts. This had been established primarily for the purposes of a dairy farm. There were a number of other localities much more suitable for dairying, including the valley of the Murray and the Northern Areas. Personally he was convinced that the industry would increase considerably in those areas. The reason for the success in the dry North was that the grasses there were much more nourishing than those in the districts of heavier rainfall. They were going to cut down the dairy work at Turretfield somewhat, and, without diminishing the area of wheat grown for seed selection and seed wheat, would try cultivation for the purpose of growing fodder for stock raising. He had frequently noted the scarcity of stock to be seen feeding in the paddocks near the railway lines from Adelaide to Terowie and elsewhere through the North. Years ago between Hamley Bridge and Gawler they could not expect anything else on account of the difficulty of securing water supplies. Now the majority of farmers had the water laid on, but he felt still there must be a large amount of feed wasted annually on account of the scarcity of stock.

LAMB EXPORT TRADE.

There was a great future before the export meat industry, as there were no signs of the British and Continental demand being overtaken. In fact, he thought the demand would become greater as, owing to the industry and enthusiasm of their officers, they had been successful in introducing South Australian lamb into Germany. Once they secured the demand and supplied good meat to European markets Australian meat would not be shut out. This year they had handled little more than 100,000 lambs at the Government Produce Depot. The annual aggregate should be from 300,000 to 400,000. The meat export trade afforded such a profitable opening that he believed it would be in the interests of the farmers, instead of cropping once in three

years, to cultivate after the first harvest for the purpose of also growing fodder for raising stock for export. The farming community had been doing great work in the past in wheat production, but the new field of investigation offered scope for fuller use being made of the land. They could grow fodder without diminishing the area ordinarily placed under wheat. There was another phase of the question, as farmers growing fodders for the production of export lambs might in bad seasons purchase store stock cheaply in the markets for fattening and subsequent sale. Farmers at Gumeracha had been following that practice for some years in a small way, and it had paid them well. They intended to see what could be done in a practical way by making the land produce one wheat crop, followed by a fodder crop, instead of allowing it to lie for the little grazing that might come in the stubbles without cultivation and sowing.

MOTOR TRACTORS.

The various Branches of the Bureau had held meetings at which farmers had from time to time discussed the merits or drawbacks of motor traction. Their minds had turned to the question of getting a quicker and cheaper method of fallowing than by the use of horses. The department had experimented with a large tractor at Roseworthy, and tests had subsequently been carried out at Turretfield over a longer period. As a consequence, to assist in the execution of the new scheme of work at Turretfield, they had purchased that tractor. It was required just at that time of the year when the horses were stale after the work of seeding, and it was necessary to get their land ploughed and prepared quickly for the fodder crops. These experiments, he thought, the Government and their experts should try first to demonstrate their practical application. South Australian farmers had done well of late years, and had succeeded so famously that they had gained an enviable reputation for knowledge and practice throughout the Commonwealth. He thought it was quite possible, however, that within the next 10 or 15 years they might do better still, and by more than holding their own in advancement, maintain their reputation as model agriculturists.

THANKS TO THE MINISTER.

At the instance of Mr. S. Eyre (Georgetown), seconded by Mr. F. H. Kelly (Saddleworth), a hearty vote of thanks was accorded the Hon. Minister for his attendance to open the Conference.

ESCUTCHEON THEORY.

As the result of a discussion at a meeting of the Gawler River Branch on the value of the escutcheon theory in regard to milch cows, Messrs. J. Hillier, J. H. Dawkins, and G. Higgins visited the Adelaide Show in March and inspected the dairy cattle there. In their report these gentlemen mentioned that until a heifer reached an age of nearly two years

it was very difficult to judge her value by her conformation. The escutcheon was a guide which would enable the dairymen to determine whether it was advisable to keep a calf. It consisted of a line of hair growing upwards on the britch of the cow. The best type was that starting wide of the britch, running up to the pin bones and almost down to the hocks. An animal possessing this formation would, it was stated, always develop into a first-class cow. The next favored marking was that beginning wide of the britch and continuing to a point within about an inch of the vulva at the top, and down well toward the hocks. A calf marked in this way, given good treatment, would, it was contended, always develop into a good cow. The third species consisted of a few hairs turning upwards, and in some cases hardly discernible. A calf of this nature should never be kept. Messrs. Higgins and Dawkins were agreed that occasionally a good cow which possessed a badly formed escutcheon might be met with, but Mr. Hillier thought otherwise. Investigation at the Adelaide Show revealed the fact that all the dairy cattle were splendidly marked in this regard.

THE HORSE'S FOOT.

The Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) delivered an address on this subject. In the foot of the horse, he said, were the pedal, coronary, and navicular bones. The pedal, or coffin bone, was a miniature of the hoof, but only occupied about a third of the space inside. It had no covering—periosteum—like other bones of the leg, but was riddled with hundreds of holes for the accommodation of blood-vessels. It had two processes or wings, one at each heel, which were attached to and covered by gristly plates, the lateral cartilages of the foot.

The coronary bone was a squarish bone, half in and half above the hoof, forming the hoof head and lower part of the pastern.

The navicular was a hard, thin bone something like a little boat in shape, whence its name. It was shuttle-shaped, and formed a joint with the other two at the back.

The joints were formed by the top of the pedal bone and the bottom of the coronary, the joint surface of the pedal being extended backward by the navicular's upper surface, forming a very elastic and resilient joint, which dispersed most of the concussion arising from the weight of the horse coming to the ground.

The tendons were mainly the one in front of the leg, which was fastened to a little projection at the top of the front of the pedal bone—this extended the leg—and the outside one of the three, which ran down the back of the leg and formed a broad band of tendon which made a sling for the navicular bone, protecting it and being inserted in the sides of the pedal bone and underneath it. Between it and the navicular bone was one of the oil sacs

of the foot, which was frequently punctured when the foot was injured by a nail or stub. There were ligaments which strengthened the joint in the foot, and others which slung the ends of the navicular bone.

CARTILAGES.

As in all joints, there were pads of gristle between the bones at the joint for the purpose of lessening concussion, but the principal ones were the lateral cartilages, which covered and extended from the wings of the pedal bone and acted as pumping agents to rid the foot of blood.

The arteries which supplied the foot came down on either side of the pastern and entered above the quarters or sides of the hoof. They immediately formed a thick network which passed through the pedal bone, where also the big veins of the foot commenced. These had no valves, but depended on the elasticity of the foot to force blood through them. Under the pedal bone, at the toe, were largish arteries and veins, which were cut when bleeding at the toe was practised.

The nerves supplying the foot followed the course of the bloodvessels, and were very numerous, so that injuries to the foot were specially painful.

The hornband was a cornice-like ring around the top of the hoof which secreted horn. If it were injured it looked something like proud flesh, owing to the points of bloodvessels in it. Severe injury to it resulted in the loss of horn. It also secreted a fine shiny waterproof covering which protected the front and sides of the hoof. Growing down from it were hundreds of very fine leaves, called the horny leaves, which could be seen in a piece of hoof freed from its contents. These assisted in the growth of horn by interweaving with hundreds of similar leaves, fleshlike and supporting thousands of subsidiary leaves. These sensitive laminæ were grown from the pedal bone and the cartilages upon it, and were the nourishing parents of the horn fibres. Underneath the pedal bone they were not leaves, but little eminences called papillæ, which fed the scales of the sole.

The horny sole was thinnish and arched. Its horn grew in scales, which were cast off as they became dry and hard. It was not a direct supporter of weight, but acted more as a spring to the wall, between which and it was a layer of cement-like cells of horn known as the white line, which acted as a warning signal to horseshoers not to drive their nails too close to it. The wall consisted of fibres of horn growing from the top downwards. It supported all the weight which came upon the foot. It was thickest at the toe and thinnest at the heels, an arrangement which allowed of considerable play or spring when the hoof came to the ground, also allowing the wear at the toe to be less harmful than at the heels. The growth of the wall appeared to be fastest at the toe, but this was apparent only, because the fibres were working forward from the heels at the same time, and they might even curl up in a diseased foot. The bars were an incurving of the wall at either

heel, forming an additional weight supporting apparatus, and at the same time permitting a free play for expansion. Between them was the frog, the triangular indiarubber-like substance the duty of which was to receive all the concussion of the first coming to ground of the foot and disperse it over the other parts to prevent injury and allow of free expansion of the heels. Above this and over the horny frog was the plantar cushion, a fibro-fatty mass which filled all the back of the inside of the foot, and effectually prevented the sensitive parts from being jarred. It acted to the foot much as did the liver and kidneys to the body, storing up nourishment and excreting waste through large sweat glands which opened out in the cleft of the frog. When the plantar cushion was diseased the discharge therefrom emitted a very offensive smell.

Moisture was essential to the formation and life of horn. That of the wall contained 25 per cent., of the sole 37 per cent., of the frog 42 per cent., so that if it were denied to these parts the frog became hard and shrivelled, while the sole caked and the wall cracked, all of which conditions produced lameness.

The structure of the foot taught that the less cutting and rasping were done the longer the foot would keep sound. The nature of the horn permitted of its being wrecked by alkalies; and it called out for cleanliness in the stable, few things giving off so much free ammonia as horsedung and urine; while the necessity for coolness and cleanliness was demonstrated by the lameness which so quickly followed neglect.

(To be continued.)



DISEASES OF FARM ANIMALS.

COMMON DIGESTIVE AILMENTS OF CALVES.

By F. M. JONES, L.V.Sc., Assistant Government Veterinary Surgeon.

Much inconvenience and consequent loss is occasioned to stockowners through failure in recognising certain digestive derangements of calves and the right choice of remedial measures for their removal. Below we deal with a few of the common ailments affecting calves, viz., constipation, indigestion, and diarrhoea.

CONSTIPATION.

At birth the bowels of calves contain a certain tenacious gluey, brownish-yellow material called meconium. This is largely derived from the liver, and must be expelled before the bowels are able to perform their normal function. The first milk of the cow, i.e., colostrum or beestings, is rich in albumen and salts, and is nature's laxative to expel this now offensive material, and should never be withheld from young animals. Sometimes, as the result of dry feeding of cows, there is an absence of this natural purgative, and the calf becomes costive. This is shown by the animal straining violently without making a passage, lying down and getting up, as in colic, and the appetite fails. No time should be lost in affording relief by administering one ounce of castor oil and assisting its action by injections of soapsuds or oil. Whatever meconium is within reach of the fingers should be removed. Also give the cow a sloppy laxative diet.

This trouble is also common in foals, and the same line of treatment should be followed.

INDIGESTION.

This may occur from many different causes, such as costiveness, a too liberal supply of milk, milk too rich, feeding with milk from a cow too long after calving, allowing a calf to suck a cow that has been driven fast or otherwise excited, keeping a calf too long from its meal so that the animal overloads its stomach on gaining access to food, feeding on stale and fermented milk, feeding an excess of artificial foods containing too much starchy material. The licking of their own or other animal's hair, and its formation into balls in stomach, will also cause indigestion in the calf.

Symptoms. Dullness, indisposition to move, uneasiness, belching of gas from stomach, sour breath, loss of appetite, alternately lying down and arising, and fulness of abdomen. The flank, if struck with the hand, gives a drumlike sound. There may be costiveness at first, but this soon gives way to diarrhoea, by which means the offensive matter may be carried off and the animal restored to health. In other cases it may be followed by inflammation of the bowels, fever sets in, and the calf gradually dies.

Treatment.—Preventive treatment should be aimed at by avoiding the causes already enumerated. First give one to two ounces of castor oil with 20 drops of laudanum or chlorodyne. If there is much belching of sour gas, give a tablespoonful of limewater or half an ounce of magnesia three or four times a day. Afterwards give a tablespoonful of rennet with a tablespoon of tincture of gentian. Should constipation return, give an injection of warm water and soap. When the trouble is due to hair balls enclosing milk undergoing putrefaction it is a good thing to give a tablespoonful of powdered charcoal three or four times a day. These hair balls in the calf may often be found in the third and fourth stomach. In the adult animal they are generally found only in first two stomachs, and are comparatively harmless.

DIARRHŒA (SCOURING.)

There are two forms of this trouble met with in calves. It may be in the form of a simple and natural action to relieve the constipated condition of the bowels, or it may be of a contagious character due to the action of bacteria which propagate the affection from animal to animal and herd to herd. This latter condition has been known to spread down the course of a river which had been contaminated by affected animals higher up the stream.

Causes.—In addition to those given under the heading “Indigestion,” any factor that lowers the animal’s vitality predisposes to this condition.

Symptoms.—These may supervene immediately after birth, almost suggesting that the cause had already existed in the body of the calf. It generally shows itself before the end of the second week. There may at first be constipation, a fetid belching of sour gas and colicky pains, as in acute indigestion. Eventually the tail becomes soiled by the liquid discharges, which at first are simply soft and mixed with mucus, with a sour and characteristic smell like putrefying cheese, which gradually increases. The amount of water and mucus gets greater; there is a large amount of undigested casein in the discharge—a condition not found in healthy fæces. In the acute stage death may result in from one to two days, from the drain on the system and the absorption of decomposing elements in the stomach and bowels. When the case is prolonged the discharges, which at first number about five to six per day, increase to 15 to 20 per day, and pass with much straining, so that they leave the animal in a stream. The color of the fæces, at first yellow, become a light-greyish or dirty white; hence the name scour. The stench is almost unbearable. The animal rapidly loses flesh, its hair stands erect, the skin gets hot, dry, and scurfy, and the nose dry and hot. At first there is no colicky symptoms, unless the trouble has originated from the stomach and bowels, and no bloated appearance; the bowels do not rumble, and there are no bubbles of gas in the fæces. The skin around the anus, or external opening, gets red, raw, and may break out in sores. The

back bowel may also get irritated and ulcerated. Fever follows, with increased breathing and temperature; the abdomen gets tucked up and fæces become more watery and mixed with blood.

Treatment.—Preventive measures include avoiding the cause of constipation and indigestion, absolute cleanliness, perfect drainage, the removal of dungheaps, and liberal application of chloride of lime to walls after scraping (solution 4ozs. to a gallon of water). Calves should also be kept apart from calving cows and their discharges. When the disease is not widespread, and only occurs in isolated cases, it may be assumed to be simple diarrhœa, and is easily dealt with. First remove the irritant from bowels by giving 1oz. to 2ozs. of castor oil, according to the size of the calf. Reduce the milk fed to one-half or two-thirds. If the stools smell offensive and sour, give 1oz. magnesia or limewater every two hours. Do not give opium, &c., at the beginning. These drugs only bind up the bowel and lock in the irritant. Follow this treatment up with one dram nitrate of bismuth, one dram of gum arabic, three times a day. Under this treatment the fæces usually become more consistent and eventually normal. If the outbreak is more general, probably it is the result of contagion. Test milk of the cow with a piece of blue litmus paper: if it reddens, reject the milk until sound. Feed on sound diet; give a course of hyposulphite of soda, 1oz. to 2oz., daily until the milk becomes alkaline, which can be easily detected by using a piece of the pink litmus, which will immediately change to blue on being placed in the milk. Give castor oil and magnesia, with a little hyposulphite of soda. An injection of a starchy solution into the back passage has good effect.

SCOURING IN NEWLY-BORN CALVES.

This occurs 24 to 36 hours after birth, and is generally fatal.

Causes.—The active agent is a bacilli. This may enter with the food, or may enter by way of a navel wound when the animal is dropped on the ground. This latter theory is supported by the fact that when the navel string is attended to and dressed with a solution of iodine no bad results follow.

Treatment.—Cleanliness as a preventive measure, with attention to navel wound, is the best advice that can be given.

CONCLUSION.

The important part that diet bears on the ailments described must be remembered. A careful selection of suitable food will be found the best preventive and easiest solution of these difficulties. Two points to be remembered in dieting calves are—(1) When feeding separator milk, with or without the addition of meals, always feed at blood temperature (after previously boiling milk); the results of feeding milk cold compared with warmed food is strikingly in favor of the warmed food. (2) Always have handy a barrel of limewater, with which to supply your young stock.

EGG-LAYING COMPETITIONS.

ROSEWORTHY AND KYBYBOLITE POULTRY STATIONS.

FINAL REPORT (Abridged).

By D. F. LAURIE, Government Poultry Expert and Lecturer.

The 1912-13 competition was the ninth held in South Australia, and the eighth as regards Roseworthy. Two previous competitions were held at Kybybolite. The first competition was held at Magill, in 1903-4.

These competitions afford us much valuable information. The large entry—134 pens at Roseworthy and 34 pens at Kybybolite, total 168 pens or 1,008 birds—shows the great interest taken by our breeders, and is a tribute to the magnitude of the industry in the State.

The results further indicate that hens properly bred, housed, and fed will give a handsome profit. The fact that the individual and general averages are so good will once more flatly contradict the opinion of some misinformed persons in other parts of the world, that our systems of breeding, &c., will lead to deterioration. In this regard our latest test again shows that South Australia is still in the lead.

The progressive results of the competitions are published in the press each week. For this, all who have the interests of the industry at heart must be very grateful to the proprietors of the various journals. The reports and scores are eagerly scanned, not only by the competitors and their friends and other breeders, but in addition numbers of otherwise non-interested persons are attracted to a study of poultry and egg production. As a fine advertisement for one of our coming and most valuable State industries, and of the State itself as a whole, one cannot sufficiently appraise their value.

The food tables in the report show exactly what it has cost, at average wholesale market prices, to feed these birds. The average cost per hen, the average profit after paying for the food, as well as the figures relating to the winning pen afford much material for thought.

These competitions, although open to the world, are primarily in the interests of South Australian producers. There is no need to publish a balance-sheet showing the whole cost of a competition. It will be readily understood that an educational undertaking is not run on strictly commercial lines. Hundreds of visitors are conducted through the pens every

N.B.—A full report with tables, &c., will be issued in bulletin form, and if readers do not receive a copy one can be had on application to the Poultry Expert, Adelaide.

year, and all points are explained to them. This would not obtain on a private commercial plant. Each pen of six birds had a separate house and yard. This system, inseparable from laying competitions, would be too expensive for a commercial plant. On such a plant the birds would be in larger flocks, and attendance (labor) would cost very much less per bird. I mention these facts to preclude any misunderstanding. Readers can see the results below. Should they require more detailed information applicable to their individual requirements, a letter to the Poultry Expert will always receive prompt attention.

LARGE PLANTS.

It is highly gratifying to report that, as the undoubted effects of the laying competitions and the work at the poultry stations, quite a large number of private poultry plants of considerable dimensions have recently been built. It is often said that our farmers are not likely to engage in poultry farming, but that the wives of farmers may be inclined towards a few fowls. It may be apropos here to refer to a statement I have very frequently made. I have never advocated poultry farming pure and simple as a universal avocation. But I do say, and hope to continue saying, that as long as there are fowls on our South Australian farms it would be but commonsense on the part of the owners to see that profitable sorts only are kept. For this reason I ask all farmers and their wives to look at the figures relating to the competition just concluded, and consider whether or not it would pay them to improve their flocks. I well know that a few sensible farmers and farmers' wives are alive to this point. I also know that many farmers' wives regret the days when there were no foxes in the State and when they owned large flocks of profitable hens. If all our farm hens were replaced by good average Leghorns, Wyandottes, Orpingtons, &c., the value of the industry would be trebled. Nevertheless, the large poultry plants now being erected near Adelaide will be the beginning of an epoch of specialist commercial breeders on a large scale.

The data derived from the competitions hitherto held has been available for all our breeders, and those who carefully study the figures are enabled to form a fair estimate for their own guidance. Few have any idea of the interest which pervades Australia as regards poultry production. In our own State are thousands of interested persons, and most of them either write, call, or telephone at intervals requesting information on various points. From the other States and from many foreign countries letters of inquiry are received. At the recent Conference of Poultry Instructors and Investigators from 28 countries it was stated that the work of our South Australian poultry stations and competitions was well known.

The detailed report of the superintendents will appear in the official report to be issued in bulletin form later on,

Part of the work connected with the competition consists in an accurate record of the general appearance and behaviour of the occupants of the various pens. The general health of the birds is closely studied, and factors favorable or prejudicial are noted and commented upon. Weakness of stock and errors in breeding show their effect at some time during the year, and breeders are advised as to possible means of improvement.

The results of the competitions are as follows :—

ROSEWORTHY.

PRIZE WINNERS.

Section I.

		£	s.	d.
1. Mrs. P. A. Uron	1,413 eggs	10	0	0
2. Sargenfri Poultry Yards	1,386 "	5	0	0
3. R. W. Pope	1,368 "	3	0	0
4. H. McKenzie	1,362 "	2	0	0
5. A. W. Hall	1,344 "	1	0	0

SPECIAL PRIZE FOR HEAVIEST YIELD OF EGGS.

Mrs. P. A. Uron, £3.

Section II.

		£	s.	d.
1. E. F. Stevens .. Langshans	1,083 eggs	10	0	0
2. L. F. Dunn Silver Wyandottes ..	1,054 "	5	0	0
3. T. C. Hall Black Orpingtons ..	1,022 "	3	0	0
4. E. V. Cant "	1,013 "	2	0	0
5. F. C. Western .. Silver Wyandottes ..	999 "	1	0	0

Section III.

		£	s.	d.
1. P. Sickert	1,331 eggs	5	0	0
2. W. Tomlinson	1,306 "	3	0	0
3. Redfern Poultry Farm	1,280 "	2	0	0

COMPARISON OF RESULTS - OPEN YARDS AND SCRATCHING SHEDS.

Twenty pens were entered in the scratching shed section by breeders who had other pens of similar breeding entered in the open yard section, No. 1.

Owner.	Breed.	Scratching Shed Pen.	Open Yard Pen.
P. Sickert	White Leghorn	1,331 eggs	1,238 eggs
W. Tomlinson	"	1,306 "	1,205 "
Moritz Bros.	"	1,234 "	1,212 "
H. Codling	"	1,061 "	1,068 "
Sargenfri Poultry Yards ..	"	1,211 "	1,386 "
W. Purvis	"	1,128 "	1,247 "
C. B. Bertelsmeier	"	1,210 "	1,148 "
A. H. Padman	"	1,343 "	1,206 "
E. D. Hocking	"	1,190 "	1,148 "
Beadnall Bros.	"	1,103 "	1,315 "
J. H. Brain	"	927 "	1,142 "
W. Provis	"	1,232 "	1,214 "
Redfern Poultry Farm	"	1,280 "	1,203 "
P. J. Broderick	"	1,111 "	1,072 "
"Koonoowarra"	"	1,010 "	1,155 "
R. G. Lillywhite	"	1,142 "	1,152 "
A. J. Cosh	"	1,042 "	1,276 "
Indra Poultry Farm	"	1,139 "	1,031 "
A. J. Whitrow	"	1,174 "	1,121 "
Tockington Park Pkty. Farm	"	1,180 "	1,184 "
Total		23,354 eggs	23,723 eggs

BREEDS AND AVERAGES.

No. Pen.	Breed.	No. Birds.	Eggs Laid.	Aver. per Hen.	Aver. per Pen.
103	White Leghorns.....	618	118,229	191.30	1,147.8
22	Black Orpingtons	132	19,871	150.54	903.2
6	Silver Wyandottes	36	5,312	147.55	885.2
1	Faverolles	6	937	156.16	937
1	Langshans	6	1,083	180.05	1,083
1	Plymouth Rocks	6	894	149	894

SUMMARY OF RESULTS.

Number of pens	134
“ hens	804
Total number of eggs laid	146,326
“ value	£663 10s. 11d.
“ cost of feeding	£227 3s. 2d.
Profit over feeding	£436 7s. 9d.
Average market price of eggs per dozen	1s. 0.06d.
“ number of eggs laid per pen	1,092
“ “ “ hen	182
“ cost of food per pen of 6 hens	£1 13s. 10.8d.
“ “ “ hen	5s. 7.8d.
Eggs laid by winning pen, Section I.	1,413
“ “ “ II.	1,083
“ “ “ III.	1,331
Highest average per hen	235.5
“ score per pen	1,413
Profit over cost of food per pen	£3 5s. 1.0d.
“ “ “ hen	10s. 10.2d.

KYBYBOLITE.

PRIZE LIST.

Section I.

			£	s.	d.
1.	Moritz Bros.	1,530 eggs	..	10	0 0
2.	“ Herdsfield ”	1,422 “	..	5	0 0
3.	F. C. Lacey	1,364 “	..	3	0 0
4.	K. E. Vorwerk	1,334 “	..	2	0 0
5.	Glenelg River Poultry Farm	1,323 “	..	1	0 0

SPECIAL PRIZE, HEAVIEST YIELD OF EGGS.

Moritz Bros., £3.

Section II.

			£	s.	d.
1.	“ Herdsfield ”	Black Orpingtons. 1,183 eggs	..	10	0 0
2.	W. F. Osborne	Silver Wyandottes 963 “	..	5	0 0
3.	Moritz Bros.	“ 821 “	..	3	0 0
4.	Glenelg River Py. Farm	Plymouth Rocks . 673 “	..	2	0 0
5.	Mrs. McNamara	Black Orpingtons. 661 “	..	1	0 0

BREEDS AND AVERAGES.

No. Pen.	Breed.	No. Birds.	Eggs Laid.	Aver. per Hen.	Aver. per Pen.
26	White Leghorns	156	30,192	193.5	1,161
1	Minorcas	6	882	147	882
3	Black Orpingtons	18	2,425	134.72	808.
2	Silver Wyandottes	12	1,786	148.83	893
2	Plymouth Rocks	12	1,388	115.66	694

SUMMARY OF RESULTS.

Number of pens	34
“ hens	204
Total number of eggs laid	36,673
“ value	£166 6s. 0-4d.
“ cost of feeding	£57 17s. 6-5d.
Profit over cost of feeding	£108 8s. 6d.
Average market price of eggs per dozen	1s. 1-00d.
“ number eggs laid per pen	1,078-7
“ “ “ hen	179-8
“ cost of food per pen of 6 hens	£1 14s. 0½d.
“ “ “ hen	5s. 8d.
Eggs laid by winning pen, Section I.	1,530
“ “ “ “ II.	1,185
Highest average per hen	255
“ score per pen	1,530
Profit over cost of food per pen	£3 3s. 9d.
“ “ “ “ hen	10s. 7 5d.

WEIGHT OF EGGS.

Regulation No. 12 reads, "Any pens the eggs from which do not attain an average weight of 24ozs. per dozen by July 31st, 1912, will be ineligible to participate in the prize money." On July 31st, 1912, a dozen eggs, the average product of each pen in the competition were weighed, and the weights carefully noted. As a result the following pens became ineligible to win any prizes.

Roseworthy. Section I., pen No. 10, R. Kerr, 23ozs.; pen 37, H. Codling, 22½ozs.; pen 42, F. J. O. Waite, 23ozs.; pen 50, A. H. Padman, 23ozs. Section II., pen 85, F. H. Robertson, 22½ozs.; pen 88, E. McKenzie, 22ozs.; pen 89, B. Kenway, 22½ozs.; pen 90, Cowan Bros., 22½ozs.; pen 94, Mrs. C. Craig, 22ozs.; pen 97, A. Phillips, 22ozs.; pen 98, B. P. Martin, 22½ozs.; pen 105, Craig Bros., 22½ozs. Section III., pen 4, H. Codling, 22½ozs.; pen 8, A. H. Padman, 22½ozs.

Kybybolite.—Section 11., pen 33, B. Bishop, 22ozs.

REASONS FOR THE RULE.

The regulation, which has been in force for some time, was made in the interests of the industry. In the endeavor to breed prolific strains of fowls there was a tendency to sacrifice size of egg in favor of mere numbers. There is no doubt that a small egg is not worth as much as a large one. Two-ounce eggs, that is eggs weighing 24ozs. to the dozen, or eight to the pound, were considered to constitute a fair standard. In all produce grading is essential, and in most countries this fact is recognised. Evenness of size is a valuable quality in an egg, as is freshness, &c. From a commercial point of view it is a serious consideration to large consumers purchasing by the dozen whether the eggs average 2ozs. each or whether they average only 1½ozs. This rule has evidently attracted the favorable attention of those engaged in the egg trade, as recently market reports have reference to "full-sized" eggs. In the new-laid egg trade in Adelaide certain well-known brands are always

sold in two grades—No. 1, 2ozs. and over; and No. 2, under 2ozs. The No. 1 grade realise a better price than grade 2. It is highly satisfactory to record that the principal breeders in this State are impressed with the importance of maintaining the weight limit of eggs.

In regard to the 1913-14 laying competition, now in progress at the Para-field Poultry Station, the rule has been amended, and is worded as follows :—
“Any pens, the eggs from which do not attain an average weight of 24ozs. per dozen by July 31st, 1913, will be ineligible to participate in the prize money, and will be returned to the owners.” Pens, therefore, which fail to reach the standard as regards weight of eggs on July 31st next will retire from the test. It may be recorded that this rule has met with universal approval in this State, and its full meaning and its far-reaching effects are obvious.

WHY SIZE DETERIORATES.

In determining why the size of the eggs deteriorate there are undoubtedly many factors requiring consideration, and they include the following :—
Breeding from immature stock; precocity, leading to laying at too early a period, and thus leading to stunting and retarding not only of body growth but also the organs of reproduction; faulty methods in breeding and rearing; faulty methods in mating. In a general way breeders are advised to avoid breeding from immature stock. Use second season hens, and special hens even up to the fourth or fifth year. Mate with full-grown vigorous cockerels, or with sound vigorous cocks.

Many pullets which come into lay about four or four and a half months lay very small eggs. An improvement may take place, and after a time the eggs may reach 2ozs. to 2½ozs. Where single testing is adopted this point can be fully studied. A hen which lays a small egg should be discarded from the breeding pen. My experience shows that size of egg is one of the characters which is transmitted by the male bird. Therefore two points are of vital importance: (1) If the cockerel is bred from a poor layer as regards numbers and, in addition, of small-sized eggs, that character will be transmitted by the hen through the cockerel to his pullet progeny. (2) It is of no use selecting good laying hens and those whose eggs are of standard size if this rule is disregarded. If such a hen, a layer of fine eggs, is sired by a male bird bred from a small-egg hen, then it is almost invariably the case that the pullets will not inherit the character for large eggs from the hen, but that this character will be dominated by the character for small eggs transmitted by the hen's sire, and again by an equally faulty male in the second generation.

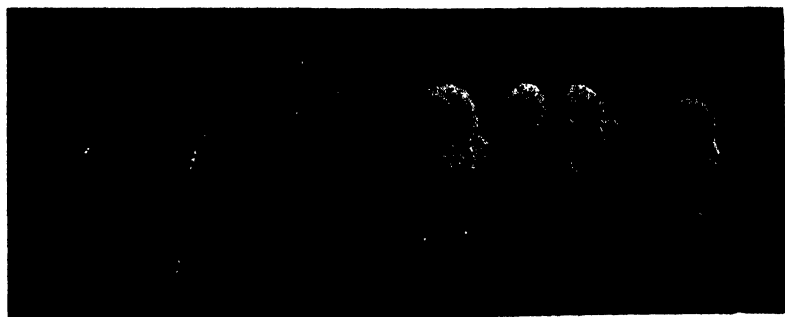
The case is not as difficult as it looks. It must be remembered that in heredity characters are not always definitely transmitted, there is always a certain percentage which follows one character, and the balance the other character, outwardly. But the outwardly correct ones, that is hens laying

large eggs, may be what in Mendelian terminology are termed heterozygotes; that is, they may have progeny laying large eggs and some which lay small eggs. If a careful, accurate record of the breeding of both male and female be kept, the trouble as regards size of eggs, and, as a general rule, all other breeding problems may be controlled.

Sires transmit characters through their daughters. Dams transmit through their sons.

EXEUNT ROSEWORTHY AND KYBYBOLITE.

As explained in another report in this issue, the poultry stations at Roseworthy and Kybybolite and Murray Bridge have ceased to exist. All future experimental and competition work will be carried out at the new Parafield Poultry Station. From Roseworthy, figuratively speaking, a mantle descends which it is hoped will be worthily worn, *i.e.*, five individual scores of over 1,500 eggs per pen of six pullets. These are—1905-6, 1,531 and 1,528; 1909-10, 1,531; 1910-11, 1,513; 1911-12, 1,589 (the world's record). This record will stand for some time to come as gained under official supervision. Kybybolite, at the third trial, also contributes a fine score—1,530—which ranks among the highest scores obtained in South Australia.



EGG-LAYING COMPETITIONS.

TWELVE MONTHS' TEST.

DETAILED SCORES.

The following are the complete scores in the two tests —

ROSEWORTHY.

[Started on April 1st, 1912, and terminated March 31st, 1913.]

Competitor.	Eggs Laid for Month ended March 31st	Total Eggs Laid from April 1st, 1912, to Mar 31st, 1913.
SECTION I.—LIGHT BREEDS.		
WHITE LEGHORNS.		
Cowan Bros., Burwood, N.S.W.	19	1,306
Tabuteau, J. O., Black Rock, Melbourne	7	1,107
Hodges, H., Pialong, Victoria	12	1,215
The Range Poultry Farm, Toowoomba, Queensland	12	1,192
Brundett, S., Moonee Ponds, Victoria	21	1,331
Jessup, W. C., Caulfield, Victoria	19	1,204
Dawes, J. H., Granville, Sydney	22	1,325
Beadnall Bros., Gawler	7	1,315
Redfern Poultry Farm, Caulfield, Victoria	10	1,203
*Kerr, R., Longwood, S.A.	15	1,315
Eckermann, W. P., Eudunda	2	1,219
McNab, J. A., Sandringham, Victoria	13	1,098
Masey, P., Alberton	11	907
Broderick, P. J., Gawler	18	1,072
Redfern Poultry Farm, Caulfield, Victoria	20	1,174
Braund, J. E. and H. J., Islington	10	1,099
Dunn, I. F., Keswick	13	1,209
Hocking, E. D., Kadina	6	1,148
Groom, E., Peterhead	10	1,092
Pope, R. W., Heidelberg, Victoria	29	1,368
Halmes, T. F., Fullarton Estate	4	986
Provis, W., Eudunda	15	1,214
Burton, W. S., Moonta Mines	9	1,123
Broster, G., Mallala	6	1,244
Brain, J. H., South Yan Yean, Victoria	12	1,142
Sargenfri Poultry Yards, East Payneham	23	1,386
McKensie, H., Northcote, Victoria	28	1,362
McDonnell, J., Greytown, Rosewater	19	1,246
Browne, A. R., Hawke's Bay, N.Z.	24	1,305
Brain, J. H., South Yan Yean, Victoria	13	1,030
Marsden, C., Welland	14	975
Hutton, C., Parkside	13	1,013
Miels, C. & H., Lakeshampton	9	1,051
Moritz Bros., Kalangadoo	19	1,212
*Codling, H., Mitcham Park	19	1,066
Troughbridge Poultry Yards, Edithburg Y.P.	22	1,089
Irvine, A. W., Epsom, Auckland, N.Z.	13	1,026
Walker, P., Hicksborough, Victoria	26	1,144
Lampe, B., Kadina	15	925
*Waite, F. J. O., Nailsworth	24	1,256

Pens marked * fail in weight of eggs

ROSEWORTHY EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended March 31st.	Total Eggs Laid from April 1st, 1912, to Mar. 31st, 1913.
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SECTION I.—LIGHT BREEDS—Continued.

WHITE LEGHORNS—Continued.

Badcock, G., Mile End	22	1,080
McClelland, A., Mordialloc, Victoria	15	1,007
Tomlinson, W., Clarence Park	29	1,206
Roberts, L. L., Kadina	24	1,130
"Strathcona," Long Plain	20	1,215
Whitegate Poultry Farm, Deepdene, Victoria	19	1,123
Purvis, Miss Gracie, Glanville	22	1,222
*Padman, A. H., Hyde Park	26	1,206
Sickert, P., Clarence Park	5	1,233
Purvis, W., Glanville	25	1,247
Rice, J. E., Cottonville	31	1,334
Hamill, H., Kogarah Bay, Sydney	19	1,171
Gurr, W. E., Kapunda	16	1,135
McLeish, E., North Adelaide	20	1,127
Craig Bros., Hackney	20	1,180
Uren, Mrs. P. A., Kapunda	17	1,413
Perry, Wm., Murrumbidgee, Victoria	20	1,060
Nancarrow, J. T., Port Adelaide	5	876
Bertelsmeier, C. B., Clare	9	1,148
Tookington Park Poultry Farm, Grange	21	1,184
Trenwith, T. H., Kadina	6	1,033
Knappstein & Bray, Clare	20	1,018
Whitegate Poultry Farm, No. 2, Deepdene, Victoria	12	1,108
"Denehollow," Caulfield, Victoria	23	1,080
Hill, Chas., Monarto South	6	656
"Islay," East Malvern, Victoria	9	1,099
Cosh, A. J., Burnside	19	1,276
Indra Poultry Farm, Freeling	15	1,031
Whitrow, A. J., Knoxville	19	1,121
Hall, T. O., Rose Park	15	1,127
Ontario Poultry Farm, Clarendon	17	1,126
Howlett, H., Moonta	16	1,098
"Koonoowarra," Enfield	17	1,165
Hall, A. W., South Oakleigh, Victoria	13	1,344
Convent of the Good Shepherd, Oakleigh, Victoria	9	1,062
Carne, E. A., Kangaroo Flat, Victoria	21	1,245
Navan Poultry Farm, Minlaton	11	960
Lillywhite, R. G., Fullarton	7	1,152
Gibbs & Pine, Queanstown	16	937
Hughes, J. J., Elsternwick, Victoria	6	1,003
Shamrock Poultry Farm, Perth, W.A.	14	1,020
Bertelsmeier, C. B., Clare	5	1,120
Nancarrow, J. T., Port Adelaide	8	1,118

SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

*Robertson, F. H., Northam, W.A.	7	777
*McKenzie, E., Northcote, Victoria	6	828
Mitchell, B., Bendigo, Victoria	7	799
Provis, W., Eudunda	22	927
*Kenway, D., West Pennant Hills, Sydney	9	1,011
*Cowan Bros., Burwood, N.S.W.	12	1,071
Kenmore Poultry Farm, Dandenong, Victoria	10	776
Brundett, S., Moonee Ponds, Victoria	10	952
Cant, E. V., Richmond	19	1,013

Pens marked * fail in weight of eggs

ROSEWORTHY EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended Feb 28th, March: 31st.	Total Eggs Laid from April 1st, 1912, to Mar. 31st, 1913.
SECTION II.—HEAVY BREEDS—<i>Continued.</i>		
BLACK ORPINGTONS—<i>Continued.</i>		
*Craig, Mrs. C., Hackney	16	909
Lampe, B., Kadina	16	860
Wirraparinga Poultry Yards, Plympton	10	844
*Phillips, A., Portland, S.A.	12	900
*Martin, B. P., Unley Park	21	1,093
Nancarrow, J. T., Port Adelaide	7	530
Padman, J. E., Plympton	21	973
Francis Bros., Fullarton	19	847
Hall, T. C., Rose Park	17	1,022
Tockington Park Poultry Farm, Grange	17	886
Bertelsmeier, C. B., Clare	20	890
*Craig Bros., Hackney	23	1,057
Bertelsmeier, C. B., Clare	20	906
SILVER WYANDOTTES.		
Dunn, L. F., Keswick	19	1,054
Tidswell, H. J., Mitcham Park	4	767
Moyes, S., Blyth	10	784
Perry, Wm., Murrumbena, Victoria	14	803
"Denehollow," Caulfield, Victoria	14	905
Western, F. C., Marion	15	999
SALMON FAVEROLLES.		
Courtenay, K., Mordialloc, Victoria	13	937
LANGSHANS.		
Stevens, E. F., Littlehampton	26	1,083
PLYMOUTH ROCKS.		
"Koonoowarra," Enfield	10	894
SECTION III.—SCRATCHING SHED SECTION.		
WHITE LEGHORNS.		
Sickert, P., Clarence Park	24	1,331
Tomlinson, W., Clarence Park	16	1,306
Moritz Bros., Kalangadoo	31	1,234
*Codling, H., Mitcham Park	12	1,061
Sargenfr Poultry Yards, East Payneham	25	1,211
Purvis, W., Glanville	28	1,128
Bertelsmeier, C. B., Clare	23	1,210
*Padman, A. H., Hyde Park	33	1,343
Hocking, E. D., Kadina	23	1,150
Beadnall Bros., Gawler	21	1,103
Brain, J. H., South Yan Yean, Victoria	19	927
Provis, W., Eudunda	15	1,232
Kedfern Poultry Farm, Caulfield, Victoria	26	1,280
Broderick, P. J., Gawler	14	1,111
"Koonoowarra," Enfield	9	1,010
Lillywhite, R. G., Fullarton	18	1,142
Coah, A. J., Burnside	18	1,042
Indra Poultry Farm, Freeling	18	1,139
Whitrow, A. J., Knoxville	24	1,174
Tockington Park Poultry Farm, Grange	25	1,180

Pens marked * fail in weight of eggs.

KYBYBOLITE.

[Started on April 1st, 1912, and terminated March 31st, 1913.]

Competitor.	Eggs Laid for Month Ended March 31st, 1913.	Total Eggs Laid from April 1st, 1912, to Mar. 31st, 1913.
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SECTION I.—LIGHT BREEDS.**WHITE LEGHORNS (except where otherwise notified).**

Glenelg River Poultry Farm, Mount Gambier	75	1,323
Dow, A., Glencoe West	14	1,051
McNamara, Mrs., Mount Gambier	28	979
Moritz Bros., Kalangadoo	84	1,530
"Mahama," Mount Gambier	65	1,255
Holmes, F. A., Frances	64	1,229
Sudholz, A., Kalangadoo	45	927
Staunton, S., Naracoorte	27	989
Hall, C. W., Mount Gambier	72	1,129
Moritz Bros., Kalangadoo	55	1,302
Vorwerk, K. E., Millicent	100	1,334
Vorwerk, H. F. & A. C., Millicent	91	1,265
Jarrad, J., Mount Gambier	29	1,111
Bartram, T. A., Kybybolite	64	1,193
Vorwerk, H. F. & A. C., Millicent	36	915
Jenkins, R. D., Kybybolite	32	981
Arthur, J. S., Bordertown	57	1,080
Drake, C., Naracoorte	43	1,097
"Eurinima," Kybybolite	51	1,206
Smith, M., Hynam	57	1,137
Lacey, F. C., Kybybolite	47	1,364
"Herdsfield," Mount Gambier	75	1,422
Blue Lake Poultry Farm, Mount Gambier	50	1,081
Beaton, W. J., Tantanoola	44	1,192
Bennett, E., Kalangadoo	63	1,098
Jones, H. F., Mount Gambier	45	982

MINORCAS.

James, S. T., Mount Gambier	45	882
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SECTION II.—HEAVY BREEDS.**BLACK ORPINGTONS.**

"Herdsfield," Mount Gambier	91	1,185
Blue Lake Poultry Farm, Mount Gambier	—	579
McNamara, Mrs., Mount Gambier	33	661

SILVER WYANDOTTES.

Moritz Bros., Kalangadoo	46	822
Osborne, W. F., Kalangadoo	59	964

PLYMOUTH ROCKS.

Bishop, B., Mount Gambier	30	715
Glenelg River Poultry Farm, Mount Gambier	10	673

D. F. LAURIE, Poultry Expert.

POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

OPERATIONS FOR APRIL.

AUTUMN DISEASES, ETC.

CHICKEN POX.

Each year, at about this period, many poultry yards are subjected to a recurrence of this disease, which may be mild or severe, simple or complicated. Chicken pox is due to a fungus—a vegetable parasite. The organism only becomes apparent when it gains entry through a lesion, or abrasion in the skin. The combs or wattles of fowls are the points most usually affected, and these appendages are generally subject to slight, often imperceptible injuries, which allow the fungus to gain entry and grow. The organism of chicken pox is probably wind-borne, and like most fungoid bacteria, thrives in moist steamy weather such as is frequently experienced in autumn. At this time of the year the mosquito is also active, and attacks the combs, wattles etc., of poultry causing minute punctures into which the fungus growth finds a way.

Symptoms.—In simple cases the birds may be in the best of health, and the attack may begin with the appearance of small vesicles, often called warts, upon the comb or wattle. If not attended to these increase in number and may run together, causing a large sore, and may even extend to the beak and corners of the mouth. Sometimes the air passages are invaded by this fungoid growth, and sometimes the case is complicated by the invasion of diphtheritic growths. The fowls soon become ill, and if the vesicles extend, as they generally do, to the eyelids, the birds become temporarily blind through closure of the eyelids and therefore cannot see to feed. Late-hatched chickens, especially, have a bad time.

Treatment.—In the mash for each 20 adult fowls, mix a solution of one ounce of magnesium sulphate (Epsom salts) in warm water. Give this once a week, and, in case of a severe outbreak, twice a week. Bathe the affected parts with weak vinegar and water, dry with a rag, and then anoint with glycerine, 15 parts, carbolic acid, 1 part. A solution of 2 per cent. formalin is also a good cure. Permanganate of potash, 2 per cent., may also be used, the bird's head being dipped therein several times. Balsam of Peru, one part, lanoline, nine parts, is also an excellent application.

When the mouth and opening of the windpipe are affected the growth may be cauterised by means of a pencil of copper sulphate (bluestone). A solution, weak, of bluestone may be applied to the head sores also. Where mosquitoes are troublesome, spray the house, just at roosting time, with a 10 per cent. kerosine and soapsuds emulsion. This will drive the mosquitoes away.

COLDS, ROUP, ETC.

Badly-housed birds and those in exposed yards often get wet and are apt to contract colds. Birds suffering from colds are feverish, and as a result have discharges of glairy fluid from the nostrils and eyes. These discharges soon become offensive if neglected, and their acrid character causes lesions which offer an entrance to bacteria such as those responsible for diphtheria, etc. Neglected colds often pave the way to outbreaks of what the fancier calls roup. Roup is a name which is applied to many diseases which have common general symptoms. Other vegetable parasites besides diphtheria may supervene upon an attack of common cold. Prevention is better than cure. House your birds adequately and protect them from the effects of the weather. In simple cases give a teaspoonful of olive oil, to which add two or three drops each eucalyptus oil and kerosine. In the mash mix enough ground ginger to give the mixture a distinctive taste. In neglected cases cures are difficult and are not worth undertaking. Should diphtheria appear the bird should be destroyed, the carcass burned. In all cases the houses should be thoroughly disinfected with a strong cresol compound.

EGGS IN AUTUMN.

Breeders who adopt modern methods and who house and feed well-bred layers are now reaping a substantial reward in the shape of high prices for plenty of eggs. The effects of the moulting season are now in strong evidence, and on the average farm, where poultry are as a rule sadly neglected, the supply of eggs is very small. Autumn and winter eggs are what pay the breeder. During the next four or five months he should make enough money to put him on a good basis for the year. Your hens will not lay in autumn and winter unless—

1. They are bred from good laying strains,
2. They are properly housed, for preference in modern scratching-shed houses;
3. They are fed regularly upon sufficient food of a proper nature.

If your fowls are unprofitable, dispose of them and secure a few good ones. Go to a reliable breeder; and remember that there is a large demand for dependable laying strains, and that they cost more than mougrels. Buy three good ones rather than six or twelve of unknown value. Cheapness is not necessarily economical.

If you are too parsimonious to provide proper houses for your poultry you should not attempt to keep them. If you still think that the ramshackle "hutch" so common in back yards is good enough, it is time you changed your opinion and learned wisdom.

If you do not know how to feed your fowls you can easily learn. Feed three good ones rather than six or twelve of unknown value. Cheapness is not necessarily economical.

Feeding is not merely a question of providing food; much depends upon how the food is mixed and how it is fed to the birds. Mash in the morning gives good results. It is made of one part bran, two parts pollard, and one part cut green food. Make a soup of liver, bones, or meat meal, and when boiling pour over the bran; cover this and let it soak for 15 to 20 minutes. Then dry off with the pollard and cut green food, so that a crumbly mass is formed. Feed this in shallow earthenware or tin pans and never throw it on the ground. Give just as much as the birds will eat in 10 minutes. At midday give a handful of cut green food and a little grain, say, half an ounce each bird. At about half an hour before sunset give the evening meal of grain, say about a pint to six hens. All grain should be of the best quality, and should be scattered in the scratching litter. Keep fresh clean water where the birds can avail themselves of it, and keep the pans clean. Provide a small trough containing gravel and shell grit, and small charcoal, bone grit, &c. If your birds are of laying strain and properly housed you will get abundance of eggs. If not you will feed in vain. Abandon the old hide-bound, erroneous ideas and adopt modern methods.

EARLY TABLE BIRDS.

Good table chickens will be both scarce and dear in spring. Table poultry breeding is very profitable if undertaken upon proper lines. For a trial any of the larger breeds will give good results, and later on you may select a breed which gives you the best results. In the meantime you should hatch as many chickens and ducklings as you can. House them well, give plenty of green food, and feed intelligently, so as to keep them growing and in good health.

GRAIN SPROUTS.

Many small holders complain that they cannot grow enough green food on the land at their disposal. Here is a way: Make some shallow boxes of $\frac{1}{2}$ in. deal 24 in. square and 3 in. deep. Build a rack of four posts 3 in. x 2 in. fitted with runners, so that the above trays can be stacked thereon 12 in. above each other. Get some good stout oats. In a kerosine tin place 1 gall. of seed and then pour on 2 galls. of warm water, to which add 20 drops of formalin (to kill fungoid growths). Let the grain soak for 48 hours in a warm room, then spread to a thickness of about an inch upon the trays,

Keep in a warm room (about 60° to 65° F.) and water twice a day with warm water (100°). In a week the tray should show a growth of 4in., and should be a mass of fine oat rootlets. One square inch per day will keep a fowl in health. One 24in. tray will feed 500 hens for one day, and you can have a tray for each day of the week. This plan works well in America. The formalin is essential to success. Oats and other grain sprouts will be used at the poultry stations.

VISITING DAYS AT PARAFIELD.

The poultry stations at Roseworthy, Kybybolite, and Murray Bridge are now closed, and are in course of removal to Parafield, near Salisbury. Here the new laying competition, in which 160 pens are entered, is in progress. The first Wednesday and the fourth Saturday in each month, between the hours of 9 a.m. and 5 p.m., have been fixed as public visiting days. On other days no admission can be gained without the written order of the Poultry Expert.

CORRESPONDENCE.

It is particularly requested that all correspondence in regard to the laying competition, poultry stations, &c., be addressed the Poultry Expert, Adelaide.



A Settler's Home on Kangaroo Island.



AGRICULTURAL BUREAU—LIFE MEMBER'S CERTIFICATE.

(About one-third size of original, which is printed in colors.)

AGRICULTURAL BUREAU REPORTS.

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Angaston	1058	19	17	Hookina	1049	15	20
Appila-Yarrowie	*	—	—	Hooper	1066	19	—
Arden Vale & Wyacca	*	—	—	Ironbank	†	18	16
Arthurton	†	—	—	Julia	1054-5	19	17
Balaklava	†	—	—	Kadina	1080	15	20
Beetaloo Valley	*	—	—	Kalangadoo	†	12	10
Belalie North	*	19	17	Kanmantoo	*	19	17
Berri	1065	19	17	Keith	1071	19	17
Blackwood	1068	14	12	Kingscote	*	1	6
Blyth	1053	19	17	Kingston	*	26	31
Booloroo Centre	*	—	—	Koppio	1062-3	17	16
Bowhill	*	—	—	Kybybolite	†	17	15
Bowmans	*	17	15	Lameroo	1067	—	—
Burra	*	—	—	Leighton	*	—	—
Bute	1059	—	—	Lipson	*	—	—
Butler	*	—	—	Longwood	†	16	14
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Coomooroo	1049	—	—	Meadows	*	21	—
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Orweroo	*	—	—	Sutherlands	*	19	17
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Parrakie	*	5	3	Tintinara	*	—	—
Paskeville	*	17	15	Two Wells	†	—	—
Penola	*	5	3	Uraidla and Summert'n	*	7	5
Penong	*	12	10	Utera Plains	1064	19	17
Petina	*	—	—	Waikerie	*	20	—
Pine Forest	1061	15	20	Warcovie	1050	—	—
Pinnaroo	*	—	—	Watervale	*	—	—
Port Broughton	*	18	16	Wepowie	*	—	—
Port Elliot	1070	19	17	Whyte-Yarcowie	1057	—	—
Port Germein	1056	—	—	Wilkawatt	1068	19	17
Port Pirie	†	5	3	Willowie	*	11	9
Quorn	†	19	—	Willunga	*	5	3
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Renmark	*	—	—	Wirrabara	1051-2	—	—
Riverton	*	—	—	Wirrega	1072	—	—
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Salisbury	*	1	6	Yabmana	*	—	—
Shannon	*	—	—	Yadnarie	1065	19	17
Sherlock	*	—	—	Yallunda	*	—	—
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* No report received during the month of March.

† Formal report only received.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—
May 14th and June 11th.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

Coomooroo. March 3.

(Average annual rainfall, 12in.)

PRESENT.—Messesrs. E. Borryman (chair), E. Brice, H. Fisher, W. Robertson, C. and C. Phillis, A. Cooke (Acting Sec.), and two visitors.

FARMING IN NEW LAND.—In a paper on this subject Mr. A. Cooke drew attention to the necessity for persons taking up land in new areas building their homesteads in close proximity to a water supply. Wells were to be preferred, and on these he recommended the erection of windmills drawing water for storage in stone tanks, cemented inside, which should be built close handy. One hundred acre paddocks would be found large enough, and these should, wherever possible, be made sheep-proof, to enable the farmer to utilise his sheep for cleaning fallow. Fallowing should be completed by the end of July, and harrowed down to a fine seed bed, sheep being put over it occasionally to keep the weeds in check. Where the farmers had the necessary strength, they could afford to await rains and then put in the crops. The selection of seed wheat should receive careful attention, and grading should always be undertaken.

Dawson. February 22.

(Average annual rainfall, 10½in.)

PRESENT.—Messesrs. E. W. Smart (chair), P. H. Baker, G. Ferguson, C. H. Meyers, J. Nottle (Hon. Sec.).

HARVEST REPORTS.—Mr. C. H. Meyers reported that he had sown Federation and Bayah wheats last season. Considering the low rainfall the returns were satisfactory. Mr. Ferguson had also received fair returns from several varieties. Mr. Baker had grown Federation and Bunyip with fairly satisfactory results. This season he intended putting in Steinwedel. The Chairman thought this variety was somewhat susceptible to smut on account of its having a more open ear than was the case with other wheats. He recommended sowing seed that was two years old.

Hookina. March 13.

PRESENT.—Messesrs. D. Madigan (chair), T. Kelly, B. Sheridan, J. Carn, B. Murphy, S. Stone (Hon. Sec.), and two visitors.

WATER CONSERVATION.—The following paper was read by the Chairman:—"In the North there is usually, at some time of the year, rain heavy enough to provide plenty of water for a good run, and in most places good holding ground can be had for dams. The best source of water is wells from underground permanent springs. These can be relied on at all seasons of the year. Unfortunately, however, some of the springs are too brackish and contain too much mineral salts, magnesia, &c., for stock. Thousands of

pounds have been lost in sinking useless wells. If a competent officer were appointed to examine all existing wells and springs, and to record their depth and purity for stock, house, and irrigation purposes, also their location, it would be of immense benefit to the present occupiers of the land. It would be useful for our Lands Department in surveying and allotting land, to know the depth and quality of spring water, and whether the land was suitable for intense culture, such as lucerne-growing. There are many places where the springs being near the surface and pure, more feed could be grown on 20 acres irrigated than on 1,000 acres without irrigation. It seems a great pity to have these good patches thrown in with large holdings. Properly worked they would be the means of saving hundreds of starving stock in time of drought. The Government could supply to existing occupiers information as to the probable depth to be sunk for water, and give a good idea of the quality of it. The best water for irrigation is fresh rainwater, and, after heavy rains, it seems a shame to see the water rushing away in swollen creeks from the Flinders Range, and beautiful flats below those hills parched in summer. The Hookina Creek, if properly dammed in the gorge, would water a few thousand acres of the Hookina Plain. At Parachilna there is also some splendid country for irrigation and a good catchment area. A few years ago it was decided to conduct some irrigation experiments at Brachina Creek, but up till the present these have not been carried out. The Willochra Creek scheme was at one time surveyed, but nothing further was done. There are several places through the Flinders Range where more water could be conserved for irrigation than at Pekina Creek. Then there are many springs in the hills between Crystal Brook and Parachilna which could be utilised to mix with the rainwater and augment the supply for irrigation. Artesian supplies may also be obtainable. I know from practical experience the benefit derived on the Western Australian goldfields from the Mundaring water supply, and there the water had to be pumped to higher ground for over 300 miles. Here the water could be delivered by gravitation as at Pekina Creek. If these water schemes were carried out economically it would surprise people to what an extent fodder could be grown, and what a great impetus would be given to dairying, fat lamb, and pig raising and bacon curing. Usually there is plenty of the best of food (grass, herbage, and bush) for about eight months of the year, and if we could grow lucerne cheaply there would be no better country for stock generally. I hope the time is not far distant when we shall see thousands of acres under lucerne and fodder grasses all along the foot of the Flinders Range. With irrigation, and the land put to its proper uses, there is room for thousands of families in this part of the North. It is only necessary to look around and see what America has done; also what has been done in Egypt. Irrigation has revolutionised things! Country which was a desert is now most fertile. I am very glad to see people taking the advice of Mr. Suter, the Government Dairy Expert, to try a small plot of lucerne. Many who have plots are amazed at the amount of green food that can be cut from it, also the benefit derived by the laying fowls from a few handfuls during the hot weather." Members discussed the paper at some length. It was generally agreed that the divining rod was a fairly reliable means of locating underground supplies of water.

Mount Remarkable, March 19.

(Average annual rainfall, 21in.)

PRESENT.—Messrs. N. S. Giles (chair), L. A. Bauer, J. McIntosh, W. Foot, M. G. Giles, W. Oldland, E. M. Willington, E. B. Andrews, W. Smith, jun., E. Mayne, C. F. Packard, and H. H. Davie.

GRADING WHEAT.—Members of this Branch are fully alive to the benefits which accrue from the grading of wheat. In addition to the above named a large number of lady and gentlemen visitors gathered at the Mount Remarkable station for the purpose of watching a demonstration of wheat-grading. The machine was worked by a small engine which consumed half a tin of petrol per day. The cost of the operation was less than 6d. per bag. Members deprecated the practice of wheatbuyers paying similar prices for wheat mixed with cracked offal and heads and good, well-graded samples. Afternoon tea was provided by the ladies.

Warcowie, March 21.

(Average annual rainfall, 11·94in.)

PRESENT.—Messrs. W. Saunders (chair), A. Telfer, Ryan, Crowden, R. Bairstow, E. Jarvis, E. Sanders, J. Feineler (Hon. Sec.), and seven visitors.

COST OF PRODUCING WHEAT.—Mr. Telfer had prepared an estimate of the cost of producing a crop of wheat, and gave the following particulars in a short paper:—"I

have endeavored to keep in mind local conditions and practices in so far as the feeding of horses and the implements used are concerned. I have assumed that the horses would be grass fed during the spring, and fed on stubbles after the harvest, and would so get about half their living in the paddock and half in the stable. I have also allowed half the feed used in the stables to be long wheaten hay and the other half wheaten (or cocky) chaff and wheat. In determining the value of plant required I have set the implements and machines in general use at approximately the cost of new, as this is the only way to come to anything like a fair and general idea of the average annual cost. I have calculated for interest 5 per cent. on the entire plant, including land and horses, which I consider any man has a right to expect if he is running his farm on business lines. Five per cent. on the value of horses and implements has been allowed for depreciation, repairs, replacements, &c. I have allowed for 1 bush. of seed per acre, and calculated that one man with a large team can fallow and crop 300 acres, except during harvest, when two men are allowed for. The figures are as follows:—Six hundred acres of land at £1 an acre, £600; 10 horses at £20 per head, £200; one eight-furrow plough, £50; one cultivator, £25; one set eight harrows, £10; one seed drill, £45; two strippers, £100; one winnower, £40; one wagon, £60; one dray, £20, making a total outlay of £1,150. The annual cost works out at—Interest on capital outlay, £57 10s.; depreciation on horses and plant, £27 10s.; three months' grass for 10 horses, £10; 25 tons hay at £3 per ton, £75; 150 bush. wheat for horse feed at 3s. 4d. per bushel, £25; 300 bush. seed wheat at 3s. 4d. per bushel, £50; one man's wages and keep for year, £90; one extra man's wages and keep during harvest, £13 10s.; a total of £348 10s., or about £1 3s. 4d. per acre." Members generally were of the opinion that anything under a 7 bush. return resulted in a loss to the farmer in this district.

Wilmington, March 19.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. J. Hannagan (chair), R. B. Scholefield, Noll, J. H. and S. Schuppan, Sloe, George, E. J. and A. R. Gloed, Zimmermann, Benier, McGhee, and B. Jericho (Hon. Sec.)

HANDLING YOUNG HORSES.—In a short paper on this subject Mr. D. George said that as a young horse was generally timid it should be caught in a crush pen or small stall. It should then have a mouthing bit put on, be left in a yard, and after about eight hours driven first one way and then the other with a rein on each side. After being taught to lead it should be tied up with a strong rope for about half an hour. He advised working a draught colt on the point of the shaft of a wagon, but the animal should not be kept at work for more than half the day for two or three weeks. A whip should not be used on a sulky horse. Members considered it important to carefully study the disposition of colts when breaking them in.

Wirrabara, January 25.

(Average annual rainfall, 30 in.)

PRESENT.—Messrs. E. J. Stevens (chair), W. H. Stevens, E. Hollett, E. and J. F. Pitman, C. F. H. Borgas, P. J. and C. H. Curnow, P. Lawson, W. Marner, H. P. Greenshields, R. L. Watson, J. Hollett, and A. R. Woodlands (Hon. Sec.)

ORCHARD PLANTING.—Mr. P. J. Curnow read the following paper:—"Before a landholder decides to plant an orchard there are many points that require careful and thoughtful consideration, points that will save many costly mistakes and that count for success and economical working in after years. The character of the various soils should be studied and only trees that suit such soils should be planted. It is a mistake to just fill up a block with trees unmindful of the fact that certain trees may be unsuited to the land. In this hot climate, with our long, dry summers, an eastern or southern aspect cannot be excelled. A northern situation catches the force of the sun for the greater part of the day, and stiff soil in particular is baked hard after every light shower. Having chosen a suitable site, clear the land of all stumps and trees. The most expeditious method of handling stumps is by using gelignite. Two plugs inserted in one hole will shatter a large stump. Rough land should be broken up with a stump-jump plough. It cannot be ploughed too deeply. In this district 20 ft. apart is the recognised distance to plant fruit trees. Holes may be dug in good soil, but on limestone rubble (which is the best for stone fruits) explosives should be used, say, one plug of dynamite to each

hole. In this way the subsoil will be broken up to a depth of 3ft. If it is desired that irrigation should later be carried on the rows of trees should be so laid out that water channels can be arranged to avoid all possible 'wash.' Care in this respect will make it possible to irrigate even on hillsides. Having prepared the holes ready for planting, several points require careful attention. Firstly, if apples are to be the main crop, care must be taken not to plant too many trees of one variety in one block, as the cross fertilisation of varieties is very important. Through not understanding this, years ago the writer made a costly error by planting hundreds of trees of one sort in a block. Through the absence of pollen of another variety, the trees in question, although flowering well, set no fruit. After several years the cause was discovered, and splendid Cleopatra trees up to 10ft. in height had to be cut back and reworked to other varieties right through the block. In another instance that came under my notice a block of export apples (2,000 trees), mostly Cleopatra, reached the age of eight years, and although they flowered well they set no crop. The owner noticed that near the centre of the block certain Cleopatras bore up to two cases each. Upon examination he found that through a mistake a Strawberry Pippin apple had been planted with the rest. This one tree had cross-fertilised all the trees near by. Those nearer the Pippin bore heavily; the row farther back less heavily; still farther out less, until the influence of the one tree became lost, and no fruit set on the Cleopatra trees after the fifth row outwards each side was reached. The owner had to cut down hundreds of trees and rework with other sorts. This meant considerable loss financially, as the bulk of the trees in the block were thus quite 12 years old before any return was received. Had this grower been able to benefit from the 'other fellow's' experience all loss would have been avoided. If I were again laying out an apple orchard I would proceed on the following lines:—If, say, two or three export varieties were to be planted, the first row from the fence would be, say, Cleopatra, the next two rows of Jonathans, then a row of Cleopatra, again two more Jonathans, and another of Cleopatra, and so on right through the block, presuming that I wanted Jonathans principally. In this way every row is exposed to the cross-fertilising influence of another variety. Pears are likewise subject to failure. It is a mistake to plant apples in heavy black soil. While the trees will do well, the abnormal growth made will generally prevent the production of fruit. Another point to remember is that apples on such land are more subject to 'bitter pit' and 'black spot.' It is also a mistake to plant with apples black soil in the gullies during a dry year, under the impression that such land will retain its dry and drained condition in ordinary years. One very wet winter like that of 1910 will kill all trees on such land, even if they are years old. In the case of well-drained river flats plums may be put in, but never peaches, apricots, nectarines, or apples. If a mixed orchard for local as distinct from an export trade be required, the procedure is somewhat different. As the peach is the most popular stone fruit generally grown, we will discuss that first. Care should be taken to plant early sorts on rising ground. A site that catches the early sun will produce earlier fruit than low-lying ground. A northern aspect will prove from one to two weeks earlier. Mention was made some time ago by a newspaper that two strawberry growers in the Adelaide hills had each a large plot of an early variety. One piece of land faced north, the other south, and although the two plots were only 300yds. apart the same variety of strawberry ripened three weeks earlier on the northern slope. Here we have evidence that situation counts for a great deal, especially where early fruit is desired. It is well to alternate the rows, for although stone fruits are less dependent on cross-fertilisation than the apples, yet with some varieties better results are obtained where this receives attention. It is also wise, when planting peaches in particular, to place varieties that ripen together in close, compact blocks. If long rows of one variety are planted it is very difficult to contend with the bird pest, whereas short rows make it possible to deal with the trouble, either with a gun or cartridge scarer. With late peaches, apricots, or nectarines (to mention only fruits that will not keep any time) it is a good plan to plant on suitable land of a low-lying character, such as a gully, for instance. In this way late sorts can be made to prolong their ripening season."

Wirrabara, February 22.

(Average annual rainfall, 30in.)

PRESENT.—Messrs. P. J. Curnow (chair), A. E. Stott, P. and H. Lawson, J. Kendrick, A. Galt, H. P. Greenshields, J., E., and C. Hollett, C. H. Curnow, E. Pitman, C. F. H. Borgas, P. R. Hoskin, W. Marner, P. L. Watson, P. H. Hookridge, O. and H. E. Woodlands, A. R. Woodlands (Hon. Sec.), and three visitors.

MOTOR ENGINES.—In a paper on this subject Mr. H. Lawson said that when selecting a motor it was desirable to secure one with a high tension magneto. The carburetter should receive attention, and he preferred two flywheels on the engine; this ensured even running. Large flywheels would enable the driver to run at a slow speed and still retain the power. The motor should not be started until all nuts had been tightened. Where a stoppage was encountered it might be due to an accumulation of dust on the collector, over-oiling, wearing down of the carbon, or the springs might be too weak to secure the necessary pressure against the collector. There was a possibility that the wires had become loose in a clip, or insulation might have been destroyed, allowing short-circuiting. Platinum contacts might have become fouled, or they might need cleaning, adjusting, or replacing. The sparking plug was likely to become sooted through the use of too much or inferior quality lubricating oil. The ends of the wires leading from the magneto to the sparking plug should not lie on any metallic part which was apt to take off or short circuit the current. The small filter on the drain screw, or the spray tube of the carburetter were likely to become choked, and these should be cleaned by the carburetter being taken to pieces and washed thoroughly in petrol. If the float were found to be leaking it should be carefully soldered up, as it was absolutely necessary that this chamber should be airtight. By lifting the needle valve one could see whether the petrol supply was in order. The petrol should flow up to the central opening in the cap of the carburetter. As this pin controlled the supply to the float, lifting it should cause the petrol to flood through the air regulator. Spare springs for inlet and exhaust valves should always be on hand. After considerable use a deposit of oil and dust was likely to settle on the seatings of the valves, preventing regular opening and shutting. In this case it would be necessary to have the valves reground in the seats. This operation was best done in a workshop with the aid of emery powder and oil. A screwdriver should be inserted into the slit on the top of the valves and worked to and fro until all rough parts were smoothed out and a gastight joint was secured. Whilst this was being done it would be necessary to lift the valve stems slightly to allow some of the grinding material to get between the surfaces. When the valve seats had been cleaned of polishing material, and presented an even dull grey-colored surface, the valves were tight; but if the seat showed uneven coloring it was necessary to renew the grinding operation. When the valves were fully ground in all the polishing material should be carefully removed from both cylinders and valves. Having both valves closed, and the exhaust valve tap also closed, an endeavor should be made to turn the handle of the engine. When the compression was sufficient to prevent the turning, the valves were tight enough.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Crystal Brook, February 22.

(Average annual rainfall, 15in.)

PRESENT.—Messes. M. P. Pavy (chair), W. W. Lovelock, W. J. Venning, R. R. Shaw, A. E. S. Clarke, J. H. Hill, T. L. Kelly, G. Sargent, H. Billingham, B.A., J. Greig, J. Teakle, A. J. L. Wilson, G. A. Solomon, R. Pavy, J. H. Shearer, and W. W. Robinson (Hon. Sec.).

REVIEW OF THE SEASON.—Mr. M. P. Pavy said that owing to the lateness of the season a good deal of wheat was sown dry in this district. Seven and a half acres of Gluyas sown on the 21st of May, prior to the rain, yielded an average of five and one-fifth bags per acre. The same variety sown during the last week in June, after rain, produced 147 bags from 20 acres, an average of seven and seven-twentieths bags per acre. Carmichael's Eclipse, put in before rain, averaged 16bush., whilst the same variety sown after the rain yielded 23bush. Mr. W. W. Lovelock did not believe in dry sowing where it could be avoided. He had sown Gluyas and Carmichael's Eclipse, and his returns averaged up to 20bush. Oats sown in March were practically a failure. Mr. T. L. Kelly commenced seeding operations on the 15th May, dry sowing Federation wheat. The land had been well worked with scarifier harrows during the autumn, and the returns equalled

15bush. to the acre. Carmichael's Eclipse sown on stubble land, the third crop, yielded two bags per acre. Mr. Hill fallowed 18 acres during the last week in August. He cross-drilled this with 60lbs. of super, and $\frac{3}{4}$ bush. of Le Huguenot wheat each way. The crop, however, was burnt off by the hot, northerly winds. Carmichael's Eclipse yielded 16bush. and bearded Gluyas 24bush. per acre. Mr. Venning said that where the land was in a lumpy, rough condition it should not be sown dry, but where it was mellow dry sowing could be safely undertaken. Mr. Billingham said that where dry sowing was practised the selection of varieties to be sown should receive careful attention. Mr. Sargent, who made a practice of seeding whether rain was experienced or not, had dry sown the whole of his wheat this season. His returns averaged 21bush. of grain and 2 tons of hay per acre. He tabled samples of Bunyip which had yielded 16bush. per acre, weighing 64½lbs. per bushel, and Carmichael's Eclipse, yielding 24bush. per acre and weighing 66lbs. per bushel. The former variety, being very early, did not receive the benefit of the later rains. Gluyas, which yielded 21bush. per acre and weighed 65lbs. to the bushel, was also exhibited.

Gladstone, February 22.

(Average annual rainfall, 15·84in.)

PRESENT.—Messrs. R. E. Lines (chair), J. H. Sargent, Potter, T. Hollitt, T. Mutter, R. Peters, W. Growden, G. Fisher, T. Sandow, R. A. Humphris, A. Anderson, T. Brown, E. H. Davies, A. B. Blesing, S. Masters, O. P. Lines, J. Eley, J. Page, R. Coe, A. E. Dinning (Hon. Sec.), and eight visitors.

MOST SUITABLE WHEATS FOR DISTRICT.—Mr. Fisher read a paper on this subject. In this district, where turnips and mustard were troublesome in the crops, early varieties of wheat, such as King's Early and Gluyas, suffered less than later sorts, for instance Federation or Marshall's. King's Early, Marshall's No. 3, Marshall's Hybrid, Yandilla King, and Pioneer Purple were best for hay and grain. For grain only Federation, Bunyip, and for an early variety Gluyas were recommended. White Tuscan, Le Huguenot, Dart's Imperial, and Lot's were good for hay. To ensure a good color in the straw, cutting should be done at that stage at which it would break rather than pull out at the first joint when pulled by the head. Large sheaves should be made, and they should be stooked as soon as possible. Hay was ready for the stack when it would break at the knots. In reply to questions the writer said he would put in at least 1½bush. of seed of early varieties. About 80lbs. or 90lbs. of manure was a suitable dressing for this district. Although Le Huguenot grew to a good height it did not yield such heavy hay as King's Early. Bunyip was a good wheat for grain.

Julia, February 22.

PRESENT.—Messrs. T. Prior (chair), A. Pfitzner, G. Garth, D. Heaslip, H. B. Traeger, W. Copley, C. Nash, T. Neylon, O. B. Pfitzner, T. Carter, W. H. Neal (Hon. Sec.), and nine visitors.

HARVESTER v. STRIPPER.—Mr. H. B. Traeger read the following paper:—"Some 12 or 15 years ago, when artificial manures were being introduced, or before super, was commonly used, it was exceedingly hard to convince many of the farmers, some, too, with many years of experience, that phosphates were necessary to ensure anything like a fair return for the expense and labor incurred. They would hold to the idea that the manure was forcing the land, and that after a very few years nothing whatever could be made to grow on land once dressed with super. Now the yields in districts adapted to its use have been enhanced fully 100 per cent. in some cases, and land values are over three times as high as they were. With harvesting machinery things are very similar. Only a few years back there were many, and even now there are those, who cannot bring themselves to believe that in the harvester brains and ingenuity have devised an implement to a large extent destined to displace the stripper and winnower, thereby solving the labor problem to a great extent. If it were not for the fact that such a large number of these machines were being used at the present time, I cannot see how wheat heaps could be cleaned up when men are not available without running a greater risk of loss and damage than most farmers can afford. Everything, of course, depends on the climatic conditions as to which of the two machines is the more suitable. In districts with an unreliable rainfall, where it is advisable to save all the wheat chaff for feeding purposes, as crops very often are not worth the cutting for hay, and where the yield seldom is up to 10bush. per acre, harvesters cannot be recommended: but in

reliable, fairly level, and not too rough or sandy country, in a crop of anything over 10 bush. per acre, the harvester is a long way ahead, provided always that a competent man works it; for, needless to say, unless the man is competent satisfactory results cannot be expected. Although simple enough in itself, a harvester requires to be carefully and properly handled, otherwise it may last only a very short time; grain may be wasted and also not properly cleaned. With careful and proper management, however, these difficulties need not arise. Where care is taken a harvester will be found to have paid for itself many times over before it is worn out. I have used one for six seasons and handled approximately 4,000 bags. At current rates for cleaning this would have already amounted to more than I paid for the machine. It has cost me just a little over £1 for repair parts, and it is now almost as good as new. A harvester will handle with ease a crop that is tangled or too dirty with mustard or other weeds for the stripper to cope with. It will gather a crop, if properly adjusted, with the least possible loss in a good season, and in seasons like the 1911-12, when stripping with the ordinary stripper was much delayed on account of cold weather, the advantage of the harvester is still more apparent. As far as cleaning is concerned, an excellent sample will be the result if everything is properly adjusted. I have not put my stripper to any use this year, and have none but harvested wheat on hand, and I am confident it will compare very favorably with the winnower-cleaned wheat of most farmers."

Julia, March 22.

PRESENT.—Messrs. D. S. Heaslip (chair), A. Pfitzner, D. Hombsch, T. Neylon, W. Thiele, R. Neal, G. Gaerth, R. W. Rowett, E. Richards, J. T. Freeman, W. Hall, H. B. Martin, J. Jaffer, C. Nash, W. H. Neal (Hon. Sec.), and seven visitors.

SHEEP ON THE FARM.—The Hon. Secretary read the following paper:—"Every farmer should keep sheep, even if he is only able to have a very few. Very often the plea is put forward, 'I cannot, because of not having a sheep-proof fence around my holding.' That is trivial, as generally speaking a decent fence for other stock consists of four wires, then, surely, whilst doing the work, it would not be a great burden to add the other one or two wires necessary. On small holdings it is impossible to go in for breeding, but no other animal as profitable can be found to take the place of sheep, even if they can only be kept in sufficient numbers to supply the meat. A few sheep in the fallow paddock will keep the rubbish from seeding. They do not require the first use of the paddock, but after the horses and cattle have finished with it there is still sheep feed left. At fallowing time there is always some feed ploughed in which perhaps would be quite useless for horses and cattle. They can be grazed on this. We must not lose sight of the fact that even if the sheep are not getting much fatter they are all the time becoming more valuable on account of the wool. I have known instances, and do not think them at all rare, where they have been bought after shearing and have been kept on until the winter and then the skins realise as much as was first paid for the animals. Never buy old sheep because they are cheap, as invariably they do badly. Often they will not fatten, and the wool is very short and sticky. For the farmer who only keeps a few dry sheep the Merino is the best. The skin is more valuable and they cut a much heavier fleece of wool than the crossbreds. Where the farmer in this locality goes in for breeding there is no doubt that lambs for export are the most profitable. For this I favor the Lincoln-Merino cross, mated with a Shropshire ram. We have had this cross and the Merinos running together for some years, and we have always found that the lamb from the crossbred ewes is much bigger and fatter and matures much more quickly than that from the Merino ewe. The size is easily accounted for, because the cross ewe is a much larger framed sheep and is a much better mother. The Merino ewe has hardly any milk at all compared with the crossbred. This part of the country is more suitable for the crossbred on account of the generally late and cold seasons, as it seems to be a much stronger constitutioned animal and stands the cold winter when feed is short much better. This is particularly noticeable in regard to aged sheep. We can fatten the cross ewe much better than the Merino. The former, of course, loses ground when shearing time comes, but the Lincoln Merino cross wool is about the best in crossbreds, and anything they lose in this respect is more than made up in the progeny."

North Booborowie, February 25.

(Average annual rainfall, 15·10"n.)

PRESENT.—Messrs. Ashby (chair), Canny, Sullivan, Mayfield, Phillips, W. C. Catt, W. and A. S. Toll, Clark, Roberts, McQuillan, Simpson (Hon. Sec.), and two visitors.

HARVEST REPORTS.—A number of members presented reports on the treatment of their land and the crops during the 1912 season. Owing to the absence of rain from August, 1911, when the land was allotted, until June, 1912, very little fallowing was done, and that land which was ploughed could not be thoroughly worked until the rains were experienced in June, 1912. Those who sowed their seed early, even before the rain, secured much heavier crops than those who sowed late. The average yield from fallow was about 22bush., and that from new land about 15bush., although in many cases the new land yielded nearly as much as fallow alongside. This, in the majority of instances, was due to the prevalence of weeds in the crops on fallow. Red rust was prevalent in some of the crops, particularly where they were on the richest soils. In some cases smut was troublesome where unpickled seed had been sown. Patches of the crop were eaten out by a small grub just after the seed had germinated. The wheats generally favored were Federation and Yandilla King. The hay returns averaged from 1 ton to 3 tons per acre, most of the wheat cut for this purpose being Yandilla King.

Port Germein, February 22.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Carmichael (chair), Stone, Hackett, Crittenden, Teasdale, Hillam, Door, McDougall, Holman, and Stock (Hon. Sec.).

IRRIGATION OF THE FARM.—Mr. Crittenden read a paper, in which he stated that many farmers were not utilising to best advantage water supplies available on their farms. He recommended the erection of either a 14ft. windmill, with a 50ft. lift, or a 16ft. mill with a 90ft. lift. Into the well a 5in. pump with a 10in. stroke should be fitted. This would keep it empty whilst it was being deepened, being capable of pumping from 10,000galls. to 15,000galls. of water per day. Tanks holding at least 100,000galls. should be connected with a 3in. main with the plot set aside for irrigation. This plant was capable of dealing with up to two acres, which could be watered by means of sprinklers. A 1½in. main down the centre of the plot could be provided with 1½in. standpipes, to which a sprinkler fitted to wheels could be connected by means of a hose. In this way, where a 60ft. hose was used, taps could be placed 115ft. apart. Splendid samples of lucerne and grapes grown under irrigation were tabled by the writer of the paper.

OATS FOR FEED.—Mr. Carmichael reported having broadcasted oats over 95 acres of stubble land. The crop was fed off three times. It provided feed for the horses working the fallow. By allowing them to run on the oats at night during the harvesting, considerably less hay was needed for feed.

Spalding, February 28.

(Average annual rainfall, 20-25in.)

PRESENT.—Messrs. E. E. Gill (chair), D. J. Campbell, S. Honnessy, A. B. Jones, J. Preiss, C. W. Smith, P. H. Gill, D. Shane, G. Page, and D. H. Campbell (Hon. Sec.).

SHEEP ON FALLOW.—Mr. S. Honnessy read a paper in which he said that with opportune rain for seeding, say 1½in. early in April, well-worked fallow would return better results than that indifferently cultivated. During the last two years, however, the wheat had to be dry sown. Four acres fallowed, and only harrowed down, were put in about the end of June, after rain, and the yield was 18bush. per acre. Well-worked fallow, sown in April, returned 9bush. per acre; the rate of seeding and manuring in each case being identical. It paid better to keep the fallow clean with sheep than to attempt to cultivate it after every rain. Two hundred and ten acres had carried 280 sheep for one month last year; not only was the fallow kept clean, but the grass land was being rested. Well-worked old land had in his case, during the past two years, carried dirtier crops than fallow not cultivated, but carrying sheep. In discussing the subject, Mr. D. J. Campbell recommended working fallow whenever possible, and running sheep on it. The three years rotation of fallow, lay land, and crop was generally favored, but Mr. P. H. Gill would include a second crop of barley or oats.

Spalding, March 28.

(Average annual rainfall, 20-25in.)

PRESENT.—Messrs. D. J. Campbell, P. A. Gill, D. Work, F. T. Sanders, J. Scriven, T. J. Preiss, W. Hacklin, and D. H. Campbell (Hon. Sec.).

COMPULSORY REGISTRATION OF STALLIONS.—Mr. D. J. Campbell read a paper in which he stated that while the imposition of a tax on stallions might result in an increase in the fees charged by the owners of certified animals, breeders who used them would have the satisfaction of knowing that they secured the service of a sound horse, which would no doubt result in a sounder and better class progeny. Horses should be rejected on account of deficiency in size as well as soundness. Compulsory registration would result in the elimination of the mongrel stallion, to the distinct benefit of the horse stock of the State. Mr. P. A. Gill, who also read a paper, considered the scheme was likely to encourage the owner of the registered animal to charge a fee beyond the reach of the average farmer. More especially would this be felt in newly-opened country, where settlers could ill afford to pay £30 or £40 for a horse, but were prepared to lay out a small fee for the services of a stallion, in the hope of breeding foals for their own use. The attempt at wiping out these mongrel stallions would most likely affect the progress of horse-breeding in South Australia, and if such were the case farmers would do well to reject the proposal. The majority of members disapproved of the compulsory registration.

FARMING FIFTY YEARS AGO.—Mr. D. J. Campbell, in an interesting paper, detailed his experiences in the Claro district, where he was farming 50 years ago. He traced the development of various implements and machinery, and mentioned that the varieties of wheat generally favored at the time were White Lamas, Golden Drop, Prolific, and White Tuscan.

Whyte-Yarcowle, March 1.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. G. F. Jenkins (chair), A. and F. Mitchell, J. McLeod, F. H. Lock, J. Mudge, G. R. Mudge, W. Mudge, Robinson, Wittwer, J. E. and T. Hunt, M. Walsh, and E. F. Pearce (Hon. Sec.).

HARVESTER v. STRIPPER.—In introducing a discussion on this subject, Mr. J. E. Hunt drew attention to the necessity for checking the spread of weeds in the cereal crops in the district. The trouble he attributed to a considerable extent to the use of the harvester, which scattered the seeds. A stripper with an 8ft. or 10ft. comb would harvest a crop twice as quickly as it could be done with the harvester, and, in addition, less skill was required in operating the former machine. Mr. Wittwer preferred the harvester where the area to be reaped was less than 300 acres, but larger areas were better dealt with by the stripper and power winnower. His opinion was that the majority of the woods had seeded before the crop was harvested. Mr. W. Mudge agreed. The Chairman attributed the popularity of the harvester to the difficulty experienced in securing suitable labor at harvest time.

CORNSACKS.—At a previous meeting members discussed at length the practicability of farmers combining and placing a bulk order for cornsacks. A resolution favoring the idea was passed, and a desire was expressed that other Branches should give their opinion on the proposal.

Yongala Vale, March 15.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. T. Keatley (chair), T. Battersby, F. and C. Miller, J. and G. Lloyd, C. and E. Fowler, E. Cooper, B. Webb, W. Keatley, G. H. Jansen (Hon. Sec.), and one visitor.

BREEDING DRAUGHT FOALS.—A paper on this subject was read by Mr. Battersby, in the course of which he stated that whilst it was advisable for the farmer to breed a few foals annually, it did not pay to breed a number unless the owner was prepared to give them plenty of feed and attention. The farmer with five or six mares could with advantage keep a stallion, which could be made to do ordinary farm work. The medium-sized draught was the most suitable, although the large, hairy-legged colt would generally bring a better price in a saleyard. Foals should be caught and handled whilst young, as there was less risk and trouble in breaking them in. When weaning he advised shutting them up and feeding regularly. All members favored the idea of handling young stock.

HARVEST REPORTS.—A number of members presented reports on the treatment of their land and the crops during the 1912 season. Owing to the absence of rain from August, 1911, when the land was allotted, until June, 1912, very little fallowing was done, and that land which was ploughed could not be thoroughly worked until the rains were experienced in June, 1912. Those who sowed their seed early, even before the rain, secured much heavier crops than those who sowed late. The average yield from fallow was about 22bush., and that from new land about 15bush., although in many cases the new land yielded nearly as much as fallow alongside. This, in the majority of instances, was due to the prevalence of weeds in the crops on fallow. Red rust was prevalent in some of the crops, particularly where they were on the richest soils. In some cases smut was troublesome where unpickled seed had been sown. Patches of the crop were eaten out by a small grub just after the seed had germinated. The wheats generally favored were Federation and Yandilla King. The hay returns averaged from 1 ton to 3 tons per acre, most of the wheat cut for this purpose being Yandilla King.

Port Germeln, February 22.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Carmichael (chair), Stone, Hacket, Crittenden, Teasdale, Hillam, Deer, McDougall, Holman, and Stock (Hon. Sec.).

IRRIGATION OF THE FARM.—Mr. Crittenden read a paper, in which he stated that many farmers were not utilising to best advantage water supplies available on farms. He recommended the erection of either a 14ft. windmill, with a 50ft. lift, or a mill with a 90ft. lift. Into the well a 5in. pump with a 10in. stroke should be fit. This would keep it empty whilst it was being deepened, being capable of pumping 10,000galls. to 15,000galls. of water per day. Tanks holding at least 100,000galls. should be connected with a 3in. main with the plot set aside for irrigation. This plant was capable of dealing with up to two acres, which could be watered by means of sprinklers. A 1½in. main down the centre of the plot could be provided with 1½in. standpipes, to which a sprinkler fitted to wheels could be connected by means of a hose. In this way, where a 60ft. hose was used, taps could be placed 115ft. apart. Splendid samples of lucerne and grapes grown under irrigation were tabled by the writer of the paper.

OATS FOR FEED.—Mr. Carmichael reported having broadcasted oats over 95 acres of stubble land. The crop was fed off three times. It provided feed for the horses working the fallow. By allowing them to run on the oats at night during the harvesting, considerably less hay was needed for feed.

Spalding, February 23.

(Average annual rainfall, 20-25in.)

PRESENT.—Messrs. E. E. Gill (chair), D. J. Campbell, S. Hennessy, A. B. Jones, J. Preiss, C. W. Smith, P. H. Gill, D. Shane, G. Page, and D. H. Campbell (Hon. Sec.).

SHEEP ON FALLOW.—Mr. S. Hennessy read a paper in which he said that with opportune rain for seeding, say 1½in. early in April, well-worked fallow would return better results than that indifferently cultivated. During the last two years, however, the wheat had to be dry sown. Four acres fallowed, and only harrowed down, were put in about the end of June, after rain, and the yield was 18bush. per acre. Well-worked fallow, sown in April, returned 9bush. per acre; the rate of seeding and manuring in each case being identical. It paid better to keep the fallow clean with sheep than to attempt to cultivate it after every rain. Two hundred and ten acres had carried 280 sheep for one month last year; not only was the fallow kept clean, but the grass land was being rested. Well-worked old land had in his case, during the past two years, carried dirtier crops than fallow not cultivated, but carrying sheep. In discussing the subject, Mr. D. J. Campbell recommended working fallow whenever possible, and running sheep on it. The three years rotation of fallow, lay land, and crop was generally favored, but Mr. P. H. Gill would include a second crop of barley or oats.

Spalding, March 26.

(Average annual rainfall, 20-25in.)

PRESENT.—Messrs. D. J. Campbell, P. A. Gill, D. Work, F. T. Sanders, J. Scriven, T. J. Preiss, W. Hacklin, and D. H. Campbell (Hon. Sec.).

by the first week in June. In discussing the paper Mr. McEwin mentioned that a raised platform, on which to store the super., facilitated the work very considerably when the manure was being carted to the drill. Mr. Montgomery had constructed a trolley about 3ft. high, 8ft. 6in. in width, and 10ft. long. With a good long plank placed on the side of this a bag of super. could be wheeled up without much difficulty.

Clare, January 17.

(Average annual rainfall, 24in.)

PRESENT.—Messrs. D. Menzie (chair), C. J. Radford, F. J. Gorteau, E. H. Kelly, F. Pryor, F. Hicks, G. Vietsen, I. C. Radford, J. H. Knappstein, J. Dux, F. W. H. Lee, R. B. James, C. T. Jarman, M. L. Nolan, F. J. Knappstein, H. Mayor, C. Scott, W. Taylor, H. A. Hanna, P. R. Pascoe, A. Hill, A. Pycroft, J. Scales, and P. H. Knappstein (Hon. Sec.).

PICKLING WHEAT IN FORMALIN SOLUTION.—The following paper was read by Mr. R. B. James:—"The pickling of wheat with a formalin solution for destroying smut is not extensively adopted as yet in Australia, but as farmers realise the higher percentage of germination secured with grain treated with this solution they will agree that it is the best. Formalin is a product of the oxidation of methyl-alcohol, and is largely used as a disinfecting agent. For pickling seed the strength of the solution should be 1lb. of formalin to 50galls. of water. I prefer to dip the bag into the pickle, allowing it to remain not less than five minutes to ensure each grain being reached by the liquid. The wheat germinates and grows more rapidly than when treated with bluestone, thus the plant is well established before extreme cold weather sets in, and in our district that is a great consideration. This solution destroys the vitality of the smut without injuring the grain, and the only disadvantage it has to my mind is that the wheat must be pickled within 10 days of the time of drilling."

Lyndoch, March 20.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), E. Springbett, H. Klauber, J. E. Linke, W. Kies, E. P. Hausler, H. O. Koch, H. Springbett, H. Kennedy, J. H. Hammat (Hon. Sec.), and one visitor.

EXHIBITS.—Mr. Springbett tabled 15in. (two joints) of a rod of the Shiraz vine. This had borne 10 shapely bunches of well-formed berries. The vine from which it was cut was over 50 years of age. It had been "bow-pruned" for very many years. Two years ago the row was cut back severely and rod-pruned ("Silvos-Cordon") as the bow-pruning was weakening the vine and reducing the crop visibly season after season. This season 13cwt. of prime grapes were harvested from the 28 vines. Mr. Burge tabled a bunch of grapes, being the only one of its kind—"Buck" currant—on a large heavily-laden Zante currant. The berries were very large and densely packed on a big bunch. Other members reported that odd bunches of similar fruit had been observed by several growers of currants this season.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Bute, February 18.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. E. W. Bettess (chair), J. Trengrove, L. Simon, H. and A. Schroeter, M. Stevens, A. Otte, S. Trengrove, W. H. Sharman, J. H. Barnes, M. Kevin, W. J. Hall, F. Schedlich (Acting Hon. Sec.).

MARKETING WHEAT.—Mr. S. Trengrove read a paper, in which he stated that although South Australia had in the past been able to command the highest prices in the world's markets for wheat, the position to-day was altered. This was in a large measure due to the fact that under the present method of selling no encouragement was given the farmer,

to clean his wheat above the requirements of the f.a.q. standard. He thought the merchants should pay a higher price for a wheat weighing well above the standard than they did for a sample just coming up to the f.a.q. requirement. A reduced price should be paid for grain affected with smut. He had used the harvester, reaper, motor winnower, and binder, and header, and had come to the conclusion that each, when properly managed, was equally capable of turning out a good sample of grain.

Kadina, March 1.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Malcolm (chair), R. Correll, G. A. Weidenbach, W. Westphall, A. Paterson, F. G. Brinkworth, J. N. Pedler, and R. J. Rose (Hon. Sec.).

WEIGHING WHEAT IN BULK.—Mr. R. J. Rose, who had gone to some trouble in collecting information with regard to this subject, initiated a discussion. He drew attention to the fact that other countries could produce wheat at a less cost than was the case with Australia, and it was therefore essential that the cost of transferring the wheat from the fields to the mills of the older countries should be kept as low as possible. At the Annual Congress of the Agricultural Bureau in 1912 the following resolution had been passed:—"That this Congress urges the Advisory Board of Agriculture to take any steps which are necessary in order to bring about the system of weighing wheat by the load over weighbridges." He had entered into communication with the Agricultural Departments of Victoria and New South Wales with regard to this matter, and had received the following replies:—From Director of Agriculture, Victoria—"Dear sir—In reply to your letter, relative to the weighing of wheat in bulk, I have to state that the system adopted at the ports of Williamstown, Port Melbourne, and Geelong is:—The wheat is received at the ports—ex country stations—in truckloads calculated to average 12 bags to the ton (this is for the guard's information when making up trains): the trucks, including contents, are then weighed by sworn weighers, and the tare of the trucks, which is painted on the sides of each, added to the weight of the covers (reckoned at 3 qrs. each) is deducted from the gross weight. Following this the weights, tare, truck number, and other details are entered on a special form and forwarded to the clerical staff, who enter the gross and net weights, together with all details contained on the waybill, on a weight certificate, which is issued to the shipper, and, if required, a copy of same is supplied to the farmer at the sending station. The freight is charged for at per ton of actual weight, and the shippers pay the producers on these weights, and a charge of 6d. is made for weighing each ordinary truck and 1s. for 'bogie' trucks. The track weighbridges are, I believe, in each instance, of 'Fairbanks' manufacture, and have a capacity of 25 tons. They are tested each morning with an engine tender (or something similar), the exact weight of which is known, and the actual weights thus assured. Though the capacity of the bridges is given at 25 tons, I am given to understand that a much greater weight, such as that of a 'bogie' (an eight-wheeled truck), can be correctly obtained by weighing one half at a time. Each weighbridge is fitted with an appliance which automatically registers the gross weight of each truck on a slip of card, which is immediately removed. The truck number, name of vessel to which it is consigned, date, &c., are entered on it, and it is then filed. The method of weighing, I am informed, is exceedingly satisfactory, and a mistake seldom occurs; but if such takes place it can be immediately rectified by reference to the 'automatic register.' Each attendant, as previously stated, is a 'sworn man,' and his duties at the ports mentioned consist only of weighing and entering the slip—the weight, tickets, &c., being attended to by others." Form Under-Secretary of Department of Agriculture, New South Wales. "Sir—I have the honor to acknowledge receipt of your letter, asking for information regarding the system of weighing wheat in bulk by means of weighbridges at railway stations or other centres, and, in reply, advise you that weighbridges in this State are under the control of the Railway Commissioners, who only instal them at railway stations where the traffic warrants same. As a rule, the Commissioners require that the output from a station shall be not less than 10,000 bags of wheat in a season." It had been stated that the approximate cost of installing weighbridges capable of weighing from 10 tons to 12 tons would be £100. In South Australia there were over 100 railway stations from which, in a season, 10,000 or more bags of wheat were trucked. An approximate estimate of the wheat received into railway yards from farmers' teams at some of the stations on the western system gave the following figures:—Walleroo, 140,000 bags; Moonta, 113,000; Snowtown, 96,000; Paskeville, 62,000; Kadina, 51,000; Green's Plains West, 49,000; Bute, 37,000; Willamulka, 30,000; Melton, 31,000. He was of opinion that the installation of weighbridges at

each of the stations mentioned would prove a profitable investment, and considerably reduce the cost of handling the wheat. It was not unusual in a busy wheat yard for teams to have to wait hours before they could be unloaded. Mr. Correll said he would like to see the system tried in this State. He doubted, however, whether it could be generally adopted. Mr. G. A. Weidenbach said it had proved a great success in the Wimmera district of Victoria.

Maitland, March 1.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Smith (chair), Bentley, J. Bowey, Heilemann, Hill, E. G. Jarrett, C. Pitcher (Hon. Sec.).

FOLLOWING.—Mr. E. G. Jarrett read the following short paper on this subject:—“From 1½ in. to 2 in. is the best depth to fallow in this district. In the first place the working is much lighter and there is less strain on the plough, especially in stumpy land. Therefore the work can be done much more cheaply. With shallow ploughing also there is a better chance of cleaning the land, as the weeds will germinate more quickly near the surface than at a greater depth. I believe that under our conditions a better crop will grow on land that is fallowed shallow and worked to a fine tilth on the surface, so that when the seed is being drilled in it is placed in a solid seed bed and covered with about 1½ in. to 2 in. of fine soil. It will then germinate better with less rain. There is also the advantage that with shallow fallowing the moisture is kept nearer the surface.” Mr. Hill noticed that the crops were light on patches where the land was stiff and had been ploughed lightly. He thought it a mistake to repeatedly plough land to the same depth, as it became solid underneath. Where this occurred it was advisable to plough without the mouldboards, say once every three years. Mr. Jarrett did not believe in stirring the subsoil. The majority of the members favored shallow ploughing.

Pine Forest, February 18.

(Average annual rainfall, 13 in.)

PRESENT.—Messrs. D. Carmen (chair), H. Adams, A. Hewett, S. T. Barr, W. Attenuborough, and R. D. Goodridge (Hon. Sec.).

CULTIVATING FALLOW.—Mr. H. Adams read a paper on this subject. While, as a general rule, it was not advisable to cultivate fallow in this district, he said heavy land could be harrowed directly after ploughing, and if necessary cultivated and harrowed again in the spring. Sandhills should be left until after harvest, when the grass should be burnt and the land cultivated after the first rain. Whilst the use of the cultivator for fallowing might not be advisable with lighter soils, firmer ground worked in this way had returned excellent results.

Yorke town, March 8.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. W. Correll (chair), A. Jung, C. Domaschkenz, C. Anderson, H. L. Heitmann, and J. Davey (Hon. Sec.).

INSURANCE AND FARMERS' RISKS.—This subject was dealt with in a paper by the Hon. Secretary, in which he said the farmer was not working on a safe financial foundation if he were not making provision against the numerous risks to which he was exposed. It was not always advisable to insure with insurance companies, as premiums were sometimes high in proportion to the risks. The farmer's land was usually of considerably more value than the improvements and stock thereon, and in the event of the total loss of these it would remain as security on which to raise funds for a fresh start. It would be better for the farmer to establish an insurance fund of his own, into which to pay from time to time amounts equal to the premiums which he would otherwise be paying. In the long run, safely invested, this would more than compensate for losses. Every precaution should, of course, be taken against fire. A good break should be ploughed around the homestead and around the paddocks, where practicable. The haystacks, stables, &c., should not be placed too close together. It was less expensive to bring hay up to the stable door in a wagon, 2 tons or 3 tons at a time, than to carry it by hand a distance of 15 yds. The stacks should be built on an elevation slightly above the stables. A light tramway could then be utilised to run the hay into the stables. When a fire

broke out in a homestead it was of utmost importance to close the doors and windows, and so shut out all draught. Buckets of water (which should always be kept handy), wet blankets, &c., could be thrown in, the doors being quickly reclosed. Losses of stock through drought could always be guarded against by the provision of fodder in the shape of hay, ensilage, &c. Boiled wheat possessed nearly double the feeding value of hay. Members generally concurred with the views of the writer.

EXHIBITS.—Fine samples of French beans, tomatoes of several varieties, sweet melons, and sunflowers were tabled by Mr. Heitmann, and much admired by members.

WESTERN DISTRICT.

Green Patch, March 17.

(Average annual rainfall, 26in.)

PRESENT.—Messrs. F. Gore (chair), P. Sinclair, G. Sinclair, H. Schwerdt, T. Muf-ray, C. Parker, C. J. Whillas (Hon. Sec.), and two visitors.

HOMESTEAD MEETING.—Members paid a visit to the garden of Mr. Gore, who had five acres under fruit trees and 12 acres under vegetables and summer fodder crops. While the fruit garden was not yet in the bearing stage, it showed careful cultivation, pruning, and general attention. The vegetable garden was situated on a black soil flat with a limestone subsoil, and there was an unlimited quantity of good quality water within a few feet of the surface. It was reported that throughout the district there were thousands of acres of similar land which at present were being made no use of. Mr. Gore had lately completed harvesting his onion crop, the yield being at the rate of about 28 tons of fine firm onions per acre. This was below the average of other years. The potatoes looked healthy, and promised a yield of about 10 tons per acre. Fine heavy crops of marrows, melons, tomatoes, beans, &c., were inspected, but peas and carrots had suffered very badly from an attack by rabbits. The maize crop had reached a height of 14ft., and sorghum looked extremely well. Mr. Gore mentioned that there was a strong local demand for fruit and vegetables. The district would greatly benefit from the adoption of a more intense system of cultivation. Failure in vegetable-growing was attributed mainly to a tendency to sow the seed too thickly, the exercise of insufficient care when planting, and neglect of cultivation. For summer fodder crops the soil required to be worked down to a fine tilth, the crops being sown in November and December. Pigs which were being fattened on peas were in excellent condition.

Koppio, February 20.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. R. Richardson (chair), T. Brennand, G. Miller, G. Howard, F. Richardson, J. Newell, H. Thompson, G. B. T. R., and M. T. Gardner, and three visitors.

EARLY FODDER CROPS.—Mr. G. B. Gardiner read a paper in which he stated that with the advent of the autumn it was advisable to prepare land for barley, rape, rye, or other similar crops for early greenfeed. This was a critical time for stock in this particular part of the State, and the farmer was well advised to go to some trouble to provide feed. He thought it would be payable to feed off crops that could be sown early, and then after the stock had been taken out, run the drill over with a light dressing of super., and follow this with the harrows. In other parts of the State wheat and barley treated in this way had returned better yields than those crops which had not been fed down. Of course, the stock should not be left in the crops after the end of July or, at the latest, early August. With the high prices prevailing for wool and fat stock the growth of fodder crops should receive every attention, and this being the case bare fallow was not profitable. In the event of early rains the fallow should be sown with rape and barley, which would provide food for sheep until the cultivation of the balance of the farm was completed. Then this ground could be turned in and very good results should follow.

Koppio, March 20.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. R. Richardson (chair), J. Newell, T. Brennand, H. Thompson, R. F. Richardson, M. Howard, and M. T. Gardner (Hon. Sec.).

ATTENTION TO DETAILS.—A paper was read by the Hon. Secretary on this subject as follows.—"Farmers are now able to look back on the past and study what schemes and what portions of their work have resulted in success or failure, and as the beginning of another year is upon them, this is the time to decide to improve on what has not been successful in the past. Everything should be put to the best use, and nothing however small should be neglected. They should take care that they do not make the same mistake twice. There are many things left undone and thought too much trouble which in themselves are not very important, but which when put together are of considerable moment. It is not the amount of money that a farmer handles in the year that counts, but the surplus over and above the cost of production. Without a lot of hard work and careful management this will not be very large in this district, which seems a difficult one to farm on anything of a large scale. Crops must be put in before the land becomes wet and boggy. I would rather aim at putting in perhaps only half or two-thirds of the quantity and putting in the extra time in making a thoroughly successful job of the seeding, than putting in a large area anyhow. I do not believe in rushing work through anyhow just for the sake of getting it finished, but would rather take the necessary time and do a little less. Of course certain things have to be done in a certain time, but it is surprising how easily difficulties are overcome by concentration and organisation of energy. Every farmer should make it his aim to have as much comfort and as many conveniences as possible in connection with his work. It is to his advantage to have good fences kept in good order, with gates hung in handy places where he can move about more readily from one paddock to the other, and for the convenience of shifting stock, and for going to and coming from work during seeding and harvesting operations. After seeding time following should progress with the utmost speed. If the land is properly ploughed and the cultivator is run over the ground once and then the roller applied, besides sheep being on it all the time, there will be no trouble with weeds. Land cannot be expected to grow a crop of wheat as well as a crop of shoots. Land that is to be cropped should be gone over at this time of the year and all loose stones and stumps should be picked up, so that implements will have a fair chance to work properly. It should be rolled after drilling, as one never knows where one may be required to put the binder in and cut the crop for hay. I believe that more hay could be profitably cut if farmers would lay themselves out to grow better crops, so that a little land instead of a lot would have to be gone over in gathering. There has been a good demand for hay in this district, and with the increasing consumption the demand seems likely to continue for some time. The cultivation both of fruit and vegetable gardens would greatly reduce the household expenses, besides ensuring a plentiful supply of good nourishing food. Without a great deal of expenditure a few small paddocks adjoining the homestead could be sown to crops and fed off in rotation with a few fat sheep and cows. Of course, these will take a little time, but where the farmer has several sons, as is often the case, this trouble would be quickly got over. It only requires the manager or the head of affairs to make up his mind to have things done, and the extra work will not be noticed. A great deal depends on the management of a farm, and with practical work well done at the right time success will almost invariably follow. Rabbits constitute the greatest evil farmers have to contend with in this district, and it is only by extra careful management and considerable labor that they will be kept under. A few days spent entirely in making fences secure round crops in the spring time will well repay the time spent. If all landholders would realise what trouble and expense the rabbits are causing in the district, and do their duty, the life of the farmer would be more pleasant. It is only by taking care of small things that the work of the farmer will be attended by the results that all work and aim for."

Mangalo, March 22.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. H. S. McKay (chair), J. C. Busch, B. McMartin, S. Burton, H. H. Klingberg, J. H. Cleave (Hon. Sec.), and four visitors.

COMPULSORY REGISTRATION AND LICENSING OF STALLIONS.—In a paper on this subject Mr. H. S. McKay pointed out that the proposal provided that those animals which passed a veterinary examination for unsoundness would be granted a licence to travel for hire on payment of a fee. Horsebreeding on stations and large farms would be unaffected where entire horses were kept for service of the owner's own mares only. Continuing,

the paper said—"It will only affect the smaller farmers who use the horses that travel the district. This law, if passed, must necessarily limit the number of horses travelling, and as their owners will be put to the expense of examination, registration, and fees they must charge more for the service, and so pass on the charges to the owners of mares. The regulation is designed for the encouragement of horse-breeding, but it will plainly have a contrary effect. It is not always a profitable industry under present conditions. If after paying for cost of service we were certain of getting a foal there might be some satisfaction in it, but to increase the cost of horse-breeding with the idea of encouraging the industry is a mistaken notion. The smaller farmers who use the hired stallion generally breed for the purpose of keeping up the strength of their own teams, and few comparatively of their stock ever enter the saleyard. The great majority of horses are bred by station owners and large farmers who are free to use any sire they choose, sound or unsound. If the proposed regulation is to have any effect on horse-breeding it should be applied to all alike, and it must be made a misdemeanor for anyone to own a stallion that is not perfectly sound." Mr. J. C. Busch favored the compulsory registration of stallions. He considered that so long as a farmer kept any sort of horse for breeding purposes there would be no good breeding in the district. Bureau Branches should club together and purchase a stallion for service in their particular district, and each horse should be only allowed a limited number of mares. Mr. H. H. Klingberg thought the scheme would only encourage farmers to keep stallions of their own, regardless of breed, so long as they secured stock good enough to work on the farm, owing to the high price that would be charged by owners of well-bred horses travelling for hire. Mr. B. McMartin considered the proposal would be unworkable unless a uniform tax were put on all stallions in the Commonwealth. The service of a stallion should be limited by legislation to a certain number. He knew of a case where one stallion visited over 80 mares. Mr. S. Burton thought the scheme would have no effect in improving the breed of horses unless all stallions were submitted to examination and licensing. The Secretary favored the proposal, and thought in the long run that a better class of horse would be the result. The majority of members were opposed to the proposal.

WHEAT STACKS ON PUBLIC ROADS.—Mention was made of the careless manner in which teamsters and others left unprotected small stacks and loads of wheat on public roads overnight, and in some cases days, to the danger of stock and the risk of loss by fire. It was unanimously decided to draw the attention of the district council to the matter, requesting that steps be taken to prevent the nuisance.

Utera Plains, February 22.

(Average annual rainfall, 14in.)

PRESENT.—Messes. Sinclair (chair), Gale, Venning, Stephens, J. and M. Abrook, H. J. and T. Hornhardt, Lee, Rule, and A. R. Ramsey (Hon. Sec.).

WEANING FOALS.—Mr. W. Gale read an article from the *Journal of Agriculture* on this subject. In the discussion which followed members generally considered it a mistake to shut foals up when they were being weaned, as they had a tendency to knock themselves about and to fret. The better policy was to put them with other young horses away from the mares.

Members generally made a practice of allowing their horses to drink before feeding. No serious results were experienced through the horses drinking when hot. They did not favor the erection of the trough in the stable-yard, nor did they think it necessary to remove the bits from the mouths of horses when they were drinking.

Utera Plains, March 22.

(Average annual rainfall, 14in.)

PRESENT.—Messes. Sinclair (chair), Gale, Venning, M. Abrook, J. Abrook, Hier, Barber, Stephens, G. Hornhardt, Hunt, Lee, and Ramsey (Hon. Sec.).

REGISTRATION OF STALLIONS.—Mr. W. E. Hier contributed a paper on this subject, in which he said—"At present stallions have to pass a veterinary examination before they can compete in a show ring. This may be of some use towards improving the horse stock, but while breed is overlooked, and only soundness taken into consideration, I fail to see where the improvement comes in. The question is, which is better for breeding, a sound mongrel or an unsound thoroughbred? It is a well-known fact that a number of our best bred draught stallions have been condemned for unsoundness, while others, that cannot be attached to any particular breed, have the Government certificate. Very likely they are sound; but of what use are they to improve the standard of South

Australian horseflesh? Breed should count as well, and unless a horse is well bred and of good type it should not be considered, even though it may be perfectly sound. I would not advocate a tax higher than £5 per annum. The owner of the stallion could cover this by making a charge of 5s. more for each mare served. Horse breeders will know that they are breeding from sound and good stock, as few owners of stallions will care to pay a tax on an illbred horse, because it will not pay them to do so. Only stallions that travel or are for the public use should be taxed, because there are quite a number of horses that cannot be castrated, and they may prove foal-getters. It would be hard for the owners of such to pay the stallion tax. Should a farmer wish to breed from them, or keep any horse, he should be allowed to do so; but unless he is breeding more than six foals per season it will not pay him to keep a horse for his own use alone. The tax will be felt by the poor man; but how many poor men breed from more than two or three mares a season? To get foals from a sound and well-bred horse is well worth the 5s. each extra, because, as a rule, men who only have two or three foals a season look after those foals better than those who have a much larger number. I feel sure that the tax will help the owners of stallions, because there always have been some mongrel horses belonging to near neighbors that some farmers will put their mares to because the price is only 30s. each. Many owners of these will not pay the tax, and the farmer will put two or three of his best mares to the stallion who is passing his farm every nine days. Therefore the stallion will not need to go over such a big round. The control of legislation dealing with the stallion tax should be vested in the district councils. The name and pedigree of the horse should be advertised in the local paper, together with the name of the owner and a statement of the district through which it is to travel." Members discussed the subject at some length. Mr. Abrook had found some of the mongrels very good horses. They were hardier and drank less water. The Hon. Secretary did not think that a tax of £5 should be imposed on stallion owners. It would be better to tax the owners of animals that had not secured a certificate of soundness.

Yadnarie, March 15.

(Average annual rainfall, 14·78in.)

PRESENT.—Messrs. W. L. Brown (chair), F. W. Dreckow, A. A. Jericho, F. H. Stubing, B. B. Crosby, S. H. Pearce, and three visitors.

FOLLOWING.—Mr. A. A. Jericho, in a paper on this subject, said that where a farmer held 1,000 acres, which was enough land for a man with one team to profitably work, portion should be utilised for grazing, portion as fallow, and portion for wheat crops. Fallowing should be commenced as early as possible after seeding. It would be better to allow the land to lie out for grazing and plough it early in the following year than to fallow it later than August. The fallow should be worked to a depth of 4in. or 5in., and the ploughing should be followed by an application of the harrows, excepting in the case of sand, which was likely to drift. By working the ground with a skim plough or cultivator after every rain falling during the last two months of the year a good deal of moisture would be conserved. Sheep should occasionally be allowed to run over the land to keep the weeds down, but where this was not sufficient a share ploughing might be found advisable in September. Under no consideration should the weeds be allowed to seed. Following a rain in February or the beginning of March, the fallow should be worked and then worked back again before the drill. Sowing should be commenced after a rain in April to give the wheat an opportunity of getting ahead of the weeds. Harrowing after the drill would result in a more even germination, and the crop should again be harrowed in August to destroy the weeds and form a mulch. Frequently two profitable crops could be grown in succession on the same land, therefore 200 acres would be sufficient for fallowing.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Berri, March 26.

(Average annual rainfall, 10in.)

MANURING FRUIT TREES.—This subject was dealt with in a lengthy paper by Mr. W. R. Lewis, from which the following is taken:—"The fertility of a soil depends partly on the plant food, such as potash, lime, phosphoric acid, and nitrogen made available, and the ability of the soil to make use of these compounds. In calculating this power

we have to take into consideration the soil's constant changes, due to the action of the atmosphere, the decay of vegetable matter, &c., and above all the methods employed in its cultivation, which is the keystone in the arch of success. We may have all the required elements in our soil, but if we fail to make them available we will fail altogether. Deep, thorough, constant cultivation gives Nature a chance. The action of the sun and air upon a soil in a good tilth will gradually make available all the food within the area of its influence; thus the greater the area exposed to their action the greater the quantity of food developed. A properly cultivated soil will draw large quantities of nitrogen from the atmosphere. All the legume family have the power of storing nitrogen. Therefore I recommend growing peas. A small quantity of superphosphate or bone super. should be drilled in with the peas to induce a strong growth as early as possible in the autumn. When full development is reached they can be ploughed under, and so a good store of nitrogen will be secured for the next crop. The decaying vegetable matter will produce humus, without which we will never succeed in producing anything like payable crops. It has been proved by tests that soils rich in humus will absorb almost double the quantity of moisture that soils lacking in this respect will take in. Lime lessens the cohesiveness of clay soils and increases that of sandy soils. There are few soils the mechanical texture of which it will not improve. It also neutralises the acids sometimes present. Sour soils, for instance, contain free acids, known as humic acid, sometimes in such quantities as to injure plant life; lime will sweeten or neutralise such. It attacks organic matter and promotes fermentation—a most active agent in producing plant food. It soon becomes a carbonate, and in that state is most beneficial to the process of nitrification, by which means inert soil nitrogen is converted into nitrates, and so becomes available. Whilst lime is the active agent in ferments that help growth, it also hinders the active growth of fungoid diseases, such as rust, smut, &c. Gypsum, which is a sulphate of lime, can be used to great advantage. Its action, apart from a plant food, consists in setting free potash from insoluble combinations in the soils. When a heap of vegetable matter, farmyard manure, urine, &c., is emitting its strong pungent odor, a little gypsum thrown over it will fix the carbonate of ammonia and convert it into sulphate of ammonia. It is also extremely useful upon land charged with alkali. By analysis a chemist can tell the contents of a soil in the form of substances upon which trees, &c., live, but he can only give a very crude idea of its texture, aeration, drainage, water supply, climatic conditions, and depth. Analyses should be supplemented by local knowledge. A soil may contain all plant food requirements and still not grow profitable crops. I would as soon expect a man or horse to work without food as to expect my garden to go on bearing heavy crops year after year without feeding. I do not see that any rule governing quantities of manure can be laid down, as they vary with the conditions of soil, cultivation, drainage, watering, &c. For local conditions local experiments are needed, with careful observation and cultivation. If an answer to the question 'does manuring pay?' is required, I can only say, 'find a successful gardener of 20 years' standing who does not manure his garden, and I will withdraw my statement that it does pay to manure.'"

Hooper, March 22.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. J. R. Beck (chair), T. Nicolle, C. S. Hall, E. G. Colton, A. Hood, J. Boyce, R. J. Chenoweth, B. Chenoweth, C. B. R. Wright (Hon. Sec.), and five visitors.

PREPARING LAND FOR SEEDING.—The following paper was read by Mr. E. G. Colton:—"If the scrub has been burnt it should be rolled, the spring backs should be cut, and then raked into lines, after which operation the sticks left by the rake should be thrown into the lines and the lot burnt as soon as possible. I should commence ploughing after the first good rain in February, using either a good 'disc' or an ordinary share plough, cutting a furrow at least 3 in. deep where possible. The disc implement does almost as good work in new ground as the ordinary plough, and the number of stumps pulled out by it are quite enough for one man to cope with during seeding. The draught is lighter and it cuts more shoots than the ordinary plough. Red ground which is at all on the heavy side should be harrowed before drilling. All seed should be graded, and no single variety should be sown on the same land and in the same locality more than three times in succession. This could be done with fair results perhaps, but if a clear new selection of the same variety were sown in the fourth year, say, better returns would undoubtedly accrue. Forty pounds of seed and 50 lbs. of manure per acre are ample for the first year where the crop is intended for grain, and the same quantity of seed and 50 lbs. to 65 lbs. of manure should be used for the second crop. It is advisable to put a heavier dressing

on the lighter soil of a sandy nature. If the rain is very late, as was the case last year, and one is compelled to commence sowing operations dry, I should not pickle, providing the sample of seed was absolutely free from smut. This only applies to a new district such as ours. If 300 or 400 acres are to be put in with one plough team only it is advisable to plough and drill, say, 100 acres at a time instead of ploughing the whole before drilling. It very seldom happens that the correct season for wheat to enter the ground and germinate lasts for more than a fortnight, so drilling should be completed within as small a space of time as possible after it is time to commence. All ground, except perhaps that of a very light sandy nature, should be harrowed after the drill and that excepted, should, I think, be rolled with a light land roller. After seeding is completed the drills should be placed under cover and the woodwork painted if necessary. Loose stumps or stones still on the crop should be picked, and shoots missed by the plough or otherwise left should be cut. In connection with the second year's crop on stubble ground I favor burning the stubble after turning stock on to it. If it is thick enough light all around the piece, but if it is too thin for this use a fire rake, and plough immediately after the burning in order to bury the ashes."

FARMING MALLEE LAND.—Mr. Colton also read the following paper:—"If a man intends to work his own block and go out contracting at the same time he can manage on £500 as his initial outlay, assuming that his block is under the new 'Crown Lands Amendment Act.' On the other hand, if he wishes to work his own block alone £1,000 should be sufficient; but, even with this amount, economy must be practised. After having assured himself of a reliable water supply, he should either do the scrub-rolling or have it done by contract. In my opinion the latter is by far the better, as there are many ways in which a man can fill in his time quite as profitably as rolling. He does not run the risk of having his horses staked, and has them in better trim for the ploughing. He should select the land for rolling in as regular a shape as possible. This minimises the time to be spent in working, there being less turning to be gone through, obviating rough usage of horses in the plough and roller and other large implements. It is advisable to select partly land of a sandy nature and partly that of the heavier kind rather than all of the one class, as with the different seasons one at least may be expected to do well. The man who has had good experience in nine cases out of ten will forge ahead of one who has not, and this particularly applies to experience in similar country. Before investing in horses the farmer should thoroughly make up his mind as to the amount of land which his finances will allow him to crop, and calculate the smallest number of horses he will need. One hundred acres put in well are as good as 200 scratched in under normal conditions at all events; of course, there are exceptions. Ploughing allows the sun's rays to penetrate the soil, enabling various particles in the air to act on chemicals contained therein, making plant foods (such as nitrogen, potash, lime, and phosphoric acid) available, and assisting in the conservation of moisture." Mr. Beck expressed the view that where the seed was graded no deterioration would take place in wheat sown on the same land for three successive years.

Lameroo, February 22.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. F. W. Eime (chair), O. Connor, Needs, J. and K. Cameron, C. R. Eime, Carter, Ross, W. M. Thyer, A. J. A. Koch (Hon. Sec.), and two visitors.

THE HARVESTER.—During the past three years Mr. Needs had found that it was possible to reap more wheat with harvesters than he could manage with strippers. Mr. C. R. Eime thought there was less waste with the harvester, as the wheat was bagged immediately. Mr. Cameron, sen., said the stripper turned out a better sample, and the Secretary preferred this means of dealing with the crop in new country, where the ground was rough and the crops were low. Another feature was the saving of cocky chaff, which was very valuable where feed was scarce.

Monarto South, March 19.

PRESENT.—Messrs. G. Patterson (chair), R. E. Anders, A. P. Braendler, B. and H. Frahn, E. and R. Hartmann, H. E. Kuchel, A. Patterson, G. H. Paech, A. Schenscher, E. Tilbrook, J. Daly, C. F. Altmann (Hon. Sec.), and eight visitors.

HANDLING HORSES.—In a paper on this subject the Chairman said it was a good plan to teach foals to tie up about the time they were weaned. The best time for breaking was when the animal reached the age of 2½ years, when it should be put in a yard or stable, roped with a strong line, and pulled quietly up to a post. The winkers or an open halter

should then be put on, a rope tied to the bit ring, and the colt run around on soft ground. After being run in the opposite direction it could be yoked to a log and made to pull this, either by itself or in company with a quiet horse, stopping or starting when commanded by the driver. The operation should be carried out as quietly as possible, and the whip should be used with discretion. The colt should by this time be fit for work in the team; but on no account should it be worked until tired, three or four hours per day being quite sufficient for the first week or so. Care should be taken to see that the harness fitted the animal, and it was a good plan to bathe its shoulders, after the harness was taken off, with cold water, salt and water, or Condyl's crystals and water. Accumulations of dirt and sweat on the collar were frequently responsible for sore shoulders. Attention to feeding and grooming was essential. In discussing the subject members generally agreed with the remarks contained in the paper. One member preferred to lead the colt out on a halter and allow it to run for some time on a long rope before having the bit placed in its mouth. Another preferred mouthing the animal by fixing the rings of the bit to a girth by means of short reins, the colt being allowed to run free in the yard.

Wilkawatt, March 22.

PRESENT.—Messrs. M. A. Neville (chair), C. and T. Sorrell, E. W. and H. H. Brooker, D. Bowmau, jun., W. R. Neville, P. Maher, B. Tylor, J. P. O'Shea, W. J. Tylor (Hon. Sec.).

FARM GARDENING.—Mr. E. W. Brooker read the following paper on this subject:—"To make a small fruit and vegetable garden on the farm I would select a piece of flat land with a gentle slope in preference to sand, in order to facilitate irrigation. I would break up the soil to a depth of from 12in. to 18in., and apply a liberal dressing of stable manure. So that the garden may be protected from storms a good plan is to leave a belt of half a chain of scrub around it. Fruit trees should be planted about 18ft. apart. This gives enough room for working between the trees and allows of the growing of vegetables whilst they are young."

SOUTH AND HILLS DISTRICT.

Blackwood, March 10.

(Average annual rainfall, 27½in.)

PRESENT.—Messrs. W. L. Summers (chair), E. Ashby, C. Scherer, P. H. and D. Williams, R. Eglinton, A. W. and A. A. Magarey, A. J. Penno, H. and L. Sullivan, H. E. Sibley, R. J. Wilson, A. A. Philips, W. Gamble, J. Turner, F. Andrews, C. G. Savage (Hon. Sec.), and two visitors.

INSECTIVOROUS BIRDS.—Mr. Ashby, in an interesting address on this subject, stated that during the brood season the number of insects consumed by birds was very large. Attention was drawn to the immense amount of good the starling did in England by feeding upon the larvæ of insects found upon the roots of the damp meadow grasses. The reason this bird was so destructive here was that at periods of the year the ground became so hard that it was unable to get at the roots of the grasses, and it therefore had to look elsewhere for food. Stress was laid upon the importance of preserving suitable breeding grounds for birds, especially in new lands, as the cutting down of all the scrub drove them away, and thus the insect pests would increase. Amongst other birds the *Pardalotus* species (diamond birds) came in for a good deal of attention, as the speaker stated that these birds were scale eaters, and thought that they might be encouraged to attack the destructive scales of our fruit trees. Several stuffed specimens of birds were tabled.

Cherry Gardens, March 18.

(Average annual rainfall, 35in.)

PRESENT.—Messrs. H. Jacobs (chair), C. Ricks, J. Lewis, S. W. Chapman, T. Jacobs, A. Broadbent, J. Tozer, J. Mildwaters, H. Lewis, A. R. Stone (Hon. Sec.), and four visitors.

HOMESTEAD MEETING.—Members took the opportunity of visiting and inspecting the homestead and orchard of Mr. C. Ricks. Particular attention was paid to orange and lemon trees, which were looking very well.

MANURING FRUIT TREES.—Members generally agreed that it paid to dress fruit trees with manure. Stable manure was preferred, but where this was not available, applications of artificial fertilisers were recommended.

Clarendon, February 27.

(Average annual rainfall, 33½ in.)

PRESENT.—Messrs. A. L. Morphett (chair), J. R. Nicolle, J. Poker, J. Spencer, L. Spencer, C. C. Spencer, H. Tester, A. Harper, H. C. Harper, E. A. Parker, H. Rowley, F. Sheidow, C. Matthews, J. Wright, E. Dunmill, W. B. Burpee, A. A. Harper, A. Phelps (Hon. Sec.), and one visitor.

FEEDING PEAS TO SHEEP.—This subject was discussed by members. A large area was put under peas in this district, the greater part being gathered with the pea-harvester. A considerable portion of the crop was marketed and a good deal used for fattening pigs. Sheep had taken the place of pigs on the stubbles, as they cleaned up the peas more quickly, and also cleared the land of rubbish. A good deal of labor was required in harvesting and cleaning this crop, but where a fair average yield was secured the best results were obtained in this way. With lighter crops, however, no doubt it would pay to feed them off. The growing of peas had to a large extent taken the place of bare fallow in this district, with considerable benefit to the crops following.

Hartley, March 19.

(Average annual rainfall, 16 in.)

PRESENT.—Messrs. B. Wundersitz (chair), S. Pratt, G. Hill, F. Schumann, W. T. Richardson, H. Cross, B. Klaebisch, A. Wundersitz, J. F. Tydeman, W. Bermingham, G. Phillips, D. Clark, F. Bruns, O. Klenke, and J. Stanton (Hon. Sec.).

STOCK AND CROPS.—Members took the opportunity of discussing a number of subjects which were suggested to them by various papers printed in the *Journal of Agriculture*. It was noticed that a member of the Cherry Gardens Branch recommended the inspection of stock daily. This was thought impracticable where many were kept. They did not think carbolic was suitable for deep wounds in animals, as it might cause them to heal too quickly. Kerosine was recommended for application in the case of cuts. Oats had been sown where trouble had been experienced with takeall, and those who had tried this were convinced that the results warranted the procedure.

Meningle, March 22.

(Average annual rainfall, 19 in.)

PRESENT.—Messrs. Mincham (chair), Court, Scott, Wright, Newson, Deane, Coad, Pettit, Dainty, Hiscock, Williams, J. and R. J. Martin, Tregilgas (Hon. Sec.), and six visitors.

DISEASE IN CATTLE.—Mr. R. M. Scott read a paper, in which he dealt with a disease which existed among cattle at the present time in this district. The trouble had been ascribed to dry bible, yacca poisoning, and paralysis. He did not think it could be diagnosed as dry bible, as the symptoms noted did not accord with those generally connected with that disease. The contention that the trouble was due to the animals eating the stalk or blooms of the yacca when it was in the honey stage hardly fitted the case, for stock depasturing on land bearing no yacca had been affected. Continuing, the paper read—"The first symptom noticed is the slow walk, as if the animal were afraid to move its legs. It then becomes very nervous, roach-backed, and partially paralysed. It begins to drag its hind legs and twist to one side; gets down and is unable to rise without help, and eventually is unable to stand up at all. During these stages of the disease the urine is very scanty, and seems involuntarily, coming away in jets, drops, or slight dribbles. There seems some doubt as to whether this is involuntary, whether there is an excess of urine, or whether there is a continuous desire to urinate owing to some restriction in the kidneys or bladder. The beast becomes constipated and very feverish, especially during hot weather. It is unable to get about on the sunny days, but during the night, when it has become cool, it will often get up and walk about fairly well. The appetite is good, and in the case of a milch cow the flow of milk continues, and the animal seems fairly healthy except for the symptoms referred to. In opening several animals which have died it has been found that the first stomach is

usually very full. The cud has been chewed and has gone back into the second stomach, but it does not gain entrance through the bible (the third stomach). The leaves of the bible stomach are of a brown color, as though burnt, and are very rotten. The sweetbread appears inflamed and is of a rusty color. The gall is very full and the liquid very dark and thick. The smaller intestines, through which the food passes after leaving the stomachs, are nearly always empty, except for wind. The bladder in some cases is very full, and the urine thick and dark in color; in other cases it is empty and shrunken, and the tubes and passages leading from it are very thick and inflamed. The kidneys in most cases seem fairly healthy. My own conclusions are that the ailment is not dry bible, and I am not yet convinced that it is yacca poisoning. I am inclined to support the belief that the complaint is a fever which is connected with some peculiarity of the season, and possibly it is encouraged by rough, dry pasture and bad drinking water. Several owners advise keeping the stock off yacca country while that plant is in bloom, or while the seeds are in a green state. Others advise burning the yacca towards the end of winter, as few will then bloom. Where the yacca area is small, or when the bloom is not numerous, the flowering spike may be cut down. My advice to dairy farmers and others who have only a few cattle, is to feed them fairly often with bonemeal, sulphate of iron, and salt, and provide fresh clean drinking water. I have not much to say in favor of treatment, as I believe almost 90 per cent. of the cattle affected die, especially if no treatment is given in its first stages. The cheapest course is to destroy them at once, and put their hides in the market. It frequently happens that a person expends £2 or £3 in nursing up a cow for several weeks, and then the animal dies. There is the loss of money and time, besides the worry one is put to attending such cases. However, if a person is inclined to treat his animals, I would suggest a trial for two or three days, and if a substantial improvement does not then show itself the animal should be destroyed without further ado. The first procedure is to give a drench of opening medicine consisting of from 12 to 16 packets of Epsom salts, 8ozs. of brown sugar thoroughly dissolved, and 1oz. of gentian mixed in about a pint and a half of water. Give bran mash made up of about 1 gall. of bran to a gallon and a half of chaff, and about half a pint of molasses. Mix with hot water and allow the mash to stand for 20 minutes covered in order to steam the chaff. Add a dessert spoon of salt and three or four packets Epsom salts to the feed once a day. If the weather is sunny keep the animal in the shade. Medicines have the best effect when given in the form of a drench. In drenching be careful not to hold the head of the beast too high or give too quickly, as there is great risk of the drench entering the lungs instead of its stomach." Members generally agreed with the views expressed in the paper. Mr. Moorehouse had tried the prescription recommended, and had injected opium and Condry's fluid into the bladder of infected animals, with the result that six out of eight cows which were attacked were rapidly recovering. Mr. Wright had successfully treated a cow with doses of nitre and aconite. Whilst undergoing treatment the animal was fed on bran mash, linseed, copra cake, and black molasses. Mr. Tregilgas attributed the trouble solely to yacca poisoning. ■

Port Elliot, March 15.

(Average annual rainfall, 20½ in.)

PRESENT.—Messrs. H. B. Welch (chair), J. Chibnall, H. Welch, H. Green, J. Brown, W. E. Hargreaves (Hon. Sec.), and two visitors.

MANURING FRUIT TREES.—Mr. W. E. Hargreaves read a paper on this subject. While there were a few places throughout the State where fair crops of fruit could be secured from unmanured trees, these were far between, and undoubtedly heavier crops would be secured if manure were applied. A heavy crop of fruit would make greater demands on the soil than would be made by a good wheat crop. Lime was especially good for apricots, peaches, plums, and all stone fruit, and if dressings of this were alternated annually with stable manure and then bonedust the results should be excellent. Manure from the fowlyard, if not spread too thickly, was also good. All dressings of fertilisers should be dug or ploughed in, otherwise the young rootlets would be encouraged to grow upwards. He had given a 12-year-old plum tree a few buckets of ashes annually, together with a little lime on one occasion, and two small dressings of stable manure. For the last seven years heavy crops have been secured from it: 4 bush. of fruit, four years ago, and three and a half cases the following year. Three trees alongside, which were treated similarly, with the exception that they received no lime or ashes, did not yield together as much as that one tree. It was a good idea to put seaweed around the trees during the summer. This would break the fall of the fruit, after which it could be raked away from the butt of the tree and burned. The ashes then should be spread around the

trunk. Two years ago he dug holes alongside two apple trees and put a wheelbarrow of manure into each. The fruit from the side on which the manure had been placed was much larger and thicker than that on the unmanured side of the tree. Three hundredweight of bonedust spread over an acre of ground with the trees 18ft. apart would work out at a cost of 2d. per tree. An increased return of one case per tree meant £13 per acre, if the fruit only brought 2s. per case. In addition to the direct fertilising benefit of the manure to the trees it was responsible for a growth of weeds, which, when ploughed or dug under added considerably to the organic content of the soil. In conclusion, he said—"During the past 10 years I have given the subject a fair trial, and have come to the conclusion that manuring results in an increased growth with young trees, and older trees take on new life and bear more and larger fruit. Experimenting is the only satisfactory method of determining the question. The growth and yield of the tree is the surest indication of the kind and quantity of manure to apply. I am quite convinced that it pays to manure orchards." Members fully agreed that the results secured from applications of manure were payable, and one member had used as much as 10cwts. to the acre annually. Lime and ashes were good for this purpose.

SOUTH-EAST DISTRICT.

Keith, February 15.

PRESENT.—Messrs. Morcom (chair), Fulwood, Schultz, Aberlee, and Lock (Hon. Sec.).

HARVEST RESULTS.—Members took the opportunity of discussing the results obtained during the last harvest. Mr. Fulwood had come to the conclusion that Federation and Hawk's Rust Proof were the best wheats for the district. Mr. Schultz thought Federation and Clubhead the best, while the Secretary preferred Federation and Lots. The majority of the crops in the district had been satisfactory, but the dry weather in October did a lot of damage.

Naracoorte, February 8.

(Average annual rainfall, 22in.)

PRESENT.—Messrs. L. Wright (chair), F. A. Holmes, W. H. Smith, C. Bray, A. Caldwell, W. E. Rogers, W. Loller, A. Langeludecke, S. H. Schinckel (Hon. Sec.), and one visitor.

FARMYARD MANURE.—In a lengthy paper dealing with this subject, Mr. W. H. Smith mentioned that none of the commercial fertilisers on the market at the present time was equal in value to farmyard manure. It was the nitrogen contained in the liquid excreta of the animals that was first rendered useful to plants, and the greater part of this nitrogen was present in the compound urea, which, in course of fermentation, was altered to carbonate of ammonia. Rotten manure was more concentrated than fresh, and it contained a larger proportion of soluble ingredients. It was thus more readily available as plant food. Horse manure fermented in six months, during which time it should be kept at a temperature of about 86° F. by having the drainings and urine poured over it. The result was the formation of humic and ulmic acids, which united with and fixed the ammonia and potash. The provision of a cement pit for the manure, and brick or cement drains for gathering the liquid to be poured over the manure, was recommended. The benefits to be derived from this treatment could be best ascertained by saving sufficient manure in a heap to dress a plot at the rate of about 5 tons to the acre until a pit as suggested above had been provided. Two plots equal in area and alongside one another should then be dressed respectively with manure from the heap and that from the pit. It would be found that the extra return received from the area dressed with pitted manure would fully compensate for the trouble involved. A competent authority had estimated the value of stable manure at 13s. per ton, and as a horse would produce about 12 tons per year, the value of manure received per year was approximately £7 16s. per horse. A good dressing of farmyard manure would keep land in good heart for at least four years, and the average farmer should be able to dress at least 25 acres annually. It had a very marked effect on the mechanical condition of the soil. It encouraged the retention of the moisture, and the nitrification which went on tended to keep the soil cool in summer. The plant rootlets ramified more freely and drainage was facilitated.

Wirrega, February 22.

PRESENT.—MESSRS. A. F. and L. Densley, J. Green, H. Laurenti, H. Exton, R. Langdon, A. Fry, R. Williams, L. Cook, (Hon. Sec.) and several visitors.

HARVEST RESULTS:—It was agreed that the returns for the year had been much greater from the gum country, from which yields of up to 15bush. per acre were realised, than from the mallee land, which at the best only yielded 7bush. or 8bush. to the acre. The white sandy soils undoubtedly produced the best crops. The mallee land, with a beautiful chocolate soil was very disappointing. It was generally agreed that it was practically useless to sow crops on the previous year's stubble, especially in mallee country.

THE FARM HOMESTEAD AND OUTBUILDINGS.—The following paper under this heading was read by Mr. H. Laurenti at a previous meeting:—“The site chosen for the homestead should be on a good piece of land, as near as possible to the centre of the block and preferably on a rise. In the mallee country stone is not always available as a building material. If it can be procured close handy, by all means use it for the house. In default of stone any one of the many portable iron or weatherboard houses can be used. The bungalow style, with a verandah, say about 8ft. wide will be found of great advantage during the summer, because the sun will not strike directly on to the walls. Build the dwelling facing north; this will ensure a cool kitchen in hot weather—a matter of no small importance. The other rooms should also be large and airy. The day of the farm hovel has passed. The extra cost of a decent house is trifling compared with the increased comfort and gain in healthier conditions. Fence in a good-sized plot round the house and net it with 5ft. netting to keep out the fowls and rabbits. This is for flower, fruit, and vegetable gardens. A hedge round the house improves the appearance and also acts as a breakwind. The stable is a most important building, and one which is frequently unworthy of the name and purpose for which it is used. Build it a fair distance from the dwelling on account of flies in summer. It should face the east on account of cold winds and rain. Roof it with iron, the same material being used for the back and ends. Pay due attention to drainage, and if possible build on an easterly slope. Have good ventilation, yet guard against draughts. Stall each horse in a 5ft. or 6ft. stall, and allow ample depth, so that when the animal is feeding the rain will not be falling on to its hindquarters. Put in a good manger. About the best I have seen here consists of flat iron bent to provide a back and front sloped slightly. The depth should be about 20in., the width at the top 24in., and at the bottom about 15in. With such a manger there is no waste, and it can always be cleaned out properly. Behind the manger leave a gangway of, say, 3ft. This is convenient when feeding. The chaff-house should be at one end of the stable, with a door leading into it from the gangway behind the manger. Put a board floor in the chaffhouse to minimise the waste by mice. In the matter of implement sheds I prefer an iron roof in every instance. Unlike thatch, it is permanent and provides a good water catchment. By using iron one can put all the implements under one cover, and so effect much saving of work in erection. It is unnecessary to have the sheds scattered all over the place. Of course, if one is using thatch for roofing it is advisable to separate them somewhat on account of fire. The difference in cost between the two is practically nil when one considers the necessity of renewing the thatch yearly and the extreme difficulty of obtaining straw in the mallee country. Unless a roof is very well thatched it will leak, and a leaky roof is a dead loss. If the iron is too hot put in a ceiling of old bags or broom. No ill effect should be experienced if the shed is of sufficient height, and depth to keep wind from blowing the rain in. If you have a further supply of stone, build the walls of the barn with it. Put up a good substantial barn, then you will be certain that your seed and feed, &c., will be well protected. It might be argued that carting stone and burning lime would take up too much time. Perhaps it would for the first two years or so on a scrub block; but, ultimately, all the most important sheds should have stone walls to replace the iron. The iron is always handy, and can be used for extensions. It is better to do this than to bump implements, horses, and yourself about year after year over stony paddocks. Another small shed that should not be overlooked is one for cocky chaff. Put in close to the stable, in circular form, about 10ft. in diameter and the same height, 10 uprights, leave space for a door, and procure a roll of rubberoid to run round the uprights to keep fowls and weather out, then roof. A round shed is not absolutely necessary, it is only a matter of opinion. I will not enlarge upon other buildings, such as the cowshed, fowl-house, &c. The man who keeps cows will continue to keep them until he provides proper shelter from the cold and wet weather.”

STRIPPER AND WINNOWER *v.* HARVESTER.—This subject had also been dealt with in a paper by Mr. F. Densley. Members generally were agreed that the stripper and winnower constituted the best method of dealing with crops in this class of country.

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All communications to be addressed:

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T. PASCOE,

Minister of Agriculture

POINTS FOR PRODUCERS.

New Egg-Laying Record.

Information has been received that a pen of White Leghorns belonging to Mr. W. A. Nixon have established a new world's egg-laying record. The birds were entered in the Papanui competition, near Christchurch, in New Zealand, and put up the remarkably fine score of 1,614 eggs for 51 weeks. The previous best was the 1,589 got by Leghorns at the Roseworthy competition in South Australia. Victoria's best is 1,566, Western Australia, 1,564; Queensland, 1,538; New South Wales, 1,481; and there have been numerous scores of over 1,500. In every instance the records were either made by South Australian hens or by hens that had South Australian blood in them, barring the 1,481 in New South Wales, which was made by Langshans. It is believed that the 1,614 record birds in New Zealand are the descendants of South Australian stock.

Keep Your Cows Warm.

Now that the winter is approaching the following paragraph from *Campbell's Scientific Farmer* should prove of interest :—" If you want a full flow of milk from your cows be gentle with them, care for them, and keep them comfortable. A cow is exceedingly sensitive, and gives up or withholds her milk according to the treatment she receives. One milker has been known to get 11lbs. of milk more per day from a cow than another milker under identical conditions. It was the result of the personal equation- the cow liked him better he no doubt treated her like a lady and she showed her appreciation by giving him a greater flow of milk. Cows are much more sensitive to cold than steers. There is a physical reason for this. *Hoard's Dairyman*, commenting on this subject, says ' The steer is storing up carbon every day in the form of fat. That means heat, internal heat. We have seen fat steers go out and lie in the snow as a measure of relief against the undue sense of heat they felt. Did anyone ever see a cow giving a good flow of milk do that? Why? Because the function of milk-giving takes the carbon and other elements out of the cow's body. To keep up that function she must be kept warm. Milk-giving presupposes at the start a certain relaxed condition of the body. Consequently, when cows are turned out in a wintry day you will see them range up along the sunny side of the barn, out of the cold wind. They instinctively feel the need of a requisite amount of warmth because of the relaxed milk-giving condition of the body they are in. Almost every farmer can see these signs of the truth of things if he will but thoroughly observe.' "

Shire Horses and Veterinary Inspection.

At the London Spring Show the veterinary inspection of shires has been carried out for 30 years. At first much unsoundness was found, but vast improvement has taken place, and the council has always resolved to make the breed as sound as the experience of breeders and the professional skill of veterinary surgeons can make it. *The Scottish Farmer*.

Development of Cattle-Breeding in Germany.

In an article in the January Bulletin of the International Institute of Agriculture, Professor Dr. Hansen, Königsberg, Prussia, deals in an informative manner with the above subject. He gives statistics showing that in 1892 the number of cattle in the whole German Empire was 17,555,834; in 1900 the total was 18,939,692; and in 1907, 20,630,544. Proceeding, he states, "With the increase of the population of the German Empire the number of animals has not kept quite pace. To every 100 inhabitants there were in 1873, 38.4 head of cattle; in 1892, 36.5; and in 1907, 33.0. It would, however, be erroneous to conclude that the present stock of cattle yielded less per inhabitant than it did in the seventies of last century. During this period not only have cattle grown in number, but also, owing to better feeding and better breeding, they have much improved in precocity, live and dead weight, in milk yield, and consequently value. . . . Though the assumption that the amount of milk produced in Germany has doubled since the seventies may be disputed, there can be no doubt that the increase in the quantity of foodstuffs produced by cattle rearing has sensibly outstripped the rise in the numbers of the population."

Vegetable Oils.

Essential oils used in perfumery have advanced considerably in value, and especially attar of roses. The following list of oils and their sources appeared in a recent issue of *Knowledge*:—Turpentine, *Pinus Australis* and *Pinus taeda*; juniper, *Juniperus communis*; nutmeg, *Myristica fragrans*; cassia, *Cinnamomum cassia*; cinnamon, *Cinnamomum zylanicum*; camphor, *Cinnamomum camphora*; mustard, *Brassica nigra*; rose, *Rosa damascena*; bitter almond, *Prunus amygdalus* var. *amara*; lemon, *Citrus medica*; orange, *Citrus aurantium*; bergamot, *Citrus bergamia*; rosemary, *Rosmarinus officinalis*; lavender, *Lavandula vera*; peppermint, *Mentha piperita*; eucalyptus, *Eucalyptus globulus*; bay, *Pimenta acris*; and cloves, *Eugenia caryophyllata*.

Experiments in Feeding Horses.

Experiments carried out in America with regard to the change in form in horses under different conditions of feeding show that the greatest width of the chest when an animal is poor, is 2in. lower than in the case of the same animal when fat. This has a very practical bearing on the stripping of shoulders, as a horse loses flesh when overworked in hot weather. More than 3½in. difference occurs under similar conditions in the girth measurement. In fattening, a large deposit of fat is stored up in the broad muscles of the back and loins.—*Livestock Journal*.

Bacteria in Milk.

Experiments made at the Edinburgh College of Agriculture to determine the bacteriological content of milk, result in recommendations to reject the fore milk, groom and wash the udder before milking, fodder and brush out the byres after milking, cool the milk to 50 F. as quickly as possible, and cleanse utensils with steam instead of cloths, which are never strictly clean.—*Agricultural Gazette*.

Agricultural Book-keeping.

"During the last 50 years, agriculture," writes Professor Dr. Ernest Caur, of Zurich-Brugg, in the Monthly Bulletin of the International Institute of Agriculture, "has made enormous progress. It has not only developed its technique in a high degree, but it has also adapted itself to the new economical conditions. While for many years farming measured its production only by the standard of its own wants, it has been forced by the general evolution of the world to wake up from its apathy, to introduce radical modifications in its systems, and thenceforward to dispose of its produce on the great markets. It is thus that in a certain sense farming has come to resemble commercial and industrial enterprises. But whilst in these the principles of book-keeping have been adopted as the basis of their activity, and carelessly kept accounts are considered as a proof of want of sense and may in some cases fall under the rigors of the law, the great majority of farmers, even to this day, think that they can farm profitably without availing themselves of the guidance afforded by book-keeping. This opinion is decidedly harmful to farming. Not only does it cause losses by the absence of the means of control, or by the introduction of measures that do not answer to the objects aimed at, but it is responsible on the one hand for the exaggerated prices paid for land and farms, and on the other for the low prices taken for the produce, which often do not cover the cost of production. It is not rare to find that farmers do not know the rate of interest that the capital engaged

in their farm is bearing ; moreover, through lack of book-keeping, they are not in a position to say what prices their produce should command so as to cover the cost of production." The author then deals with the measures taken to introduce agricultural book-keeping among the farming classes of Switzerland and the systems in vogue in that country.

Experiments in Manuring Hay and Oats.

The average results of experiments in the manuring of the hay crop at 23 centres in 13 counties of Ireland are given in the *Journal of the Irish Department of Agriculture*. The greatest average yield was 3 tons 2cwts. of hay per acre, obtained on the plots dressed with 1cwt. nitrate of soda, 2cwts. superphosphate, and 2cwts. kainit per acre. The average value of the crop after deducting the cost of one year's manure was £4 19s., which may be compared with £4 4s. 6d. where no manure was used. But the superiority of the aftermath needs to be taken into account to the credit of the manure. In all grass manuring experiments, however, the effect of each dressing upon the character of the herbage should be examined, and, if there had been a plot dressed with superphosphate and kainit, without nitrate of soda, it is not improbable that it would have shown the best results, considering the quality of the herbage as well as the yield. In the same publication the average results of 150 experiments in the manuring of oats during 11 years are given. The greatest yield and profit were obtained from the application of 1cwt. sulphate of ammonia, 3cwts. superphosphate, and 3cwts. kainit per acre. The increase in grain over the produce of the unmanured plots averaged nearly 7cwts. per acre, and the net gain from the manures was £1 4s. 7d. per acre. When the kainit was omitted the net gain was only 4s. 6d. per acre less than that derived from the use of the complete mixture.

Egg and Poultry Demonstration Train.

An arrangement, says the *Agricultural Gazette*, has been arrived at by the Agricultural Organization Society and the National Poultry Organization Society with the London and North-Western Railway Company for an egg and poultry demonstration train to tour North Wales from April 23rd to May 6th. The company has placed at the disposal of the societies two of its largest vans. Cases of eggs from all countries supplying the British markets will be on view, showing quality of eggs and systems of packing, also specimens of the various grades of dead poultry will be displayed. The importance of co-operation in marketing will be emphasized at the various meetings held.

Crops in the United Kingdom.

Statistics published by the English Board of Agriculture and Fisheries show that the estimated yield of wheat in the United Kingdom in 1912 was 7,175,000 quarters, the yield of barley was 7,276,000 bush., and of oats 20,600,000 bush. The returns for root crops are given as—Potatoes, 5,276,000 tons; turnips and swedes, 24,062,000 tons; mangolds, 10,138,000 tons, and the yield of hay, 14,024,000 tons. It is stated that for every crop, with the exception of meadow hay and hops, the yield in 1912 was below the average. The most deficient crops were potatoes, peas, and oats, which were 20, 17, and 15 per cent. respectively less than the average of the previous decade. The yield of the potato crop was the lowest on record.

English Dead Meat Trade.

Interesting particulars of the dead meat trade in England are given by Mr. O. W. H. Roulston in *Journal*, vol. xiii., No. 1, of the Department of Agriculture and Technical Instruction for Ireland. The value of the meat consumed in England between the years 1856 and 1862 was 2s. 6d. per inhabitant per year, while in the period 1905-1911 it rose to 21s. 7d. The value of the meat imported during these two periods rose from £3,584,000 to £48,042,000. While in 1897 the amount of living cattle imported, namely, 4,000,000 cwts., exceeded by much the quantity of beef imported (3,500,000 cwts.) in 1911 the former sank to 1,300,000 cwts., and the latter rose to 8,000,000 cwts. A similar change took place with mutton. These variations are due principally to two causes. The exportation of living animals is always liable to interruption by the outbreak of some disease leading to the prohibition of imports by other countries. Consequently, when the introduction of dead meat has once begun no one cares to go back to the exportation of living animals. The second reason is that the cost of transport of dead meat, both by rail and by ship, is considerably inferior to that of living animals. Besides which there is the advantage that with the dead meat trade other industries can be connected, such as converting some of the offal into useful food stuffs, leather tanning, the manufacture of soap, margarine, glue, horn combs, fertilisers, &c. All these reasons contribute to give the dead meat trade a broad and firm basis in the Smithfield market. The buildings of this, the greatest meat market in the world, cover an area of about 10 acres, and include 344 butchers' shops, with a staff of about 5,000 persons. The amount of meat it dealt with in 1907 was 419,037 tons, and in 1911, 435,316 tons. Of this mass of meat 77.2 per cent. came from the colonies and from abroad, of which 80 per cent. was imported in cold storage. Argentina provides the greatest quantity of beef, whilst New Zealand is the greatest purveyor of mutton, though Australia sends nearly as much. The United

States and Denmark hold the first place as providers of bacons and hams, while Holland supplies the greatest quantity (80 per cent.) of fresh pork. In the United Kingdom itself for a long time past Scotland has forwarded the best qualities of beef and mutton. In particular, Aberdeen sends to Smithfield, in specially built railway cars, great quantities of meat, which command the highest prices.

Imports and Exports of Fruits and Plants, etc.

During the month of March, 1913, 5,129bush. of fresh fruits, 2,945bush. of bananas, 253 bags of potatoes, 3pkgs. of bulbs, and 2pkgs. of plants were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 85bush. of fresh fruits and 240½bush. of bananas were destroyed (over-ripe). Under the Federal Commerce Act, 34,576 cases of fresh fruits, 303pkgs. of honey, 114pkgs. of preserved fruit, 362pkgs. of dried fruit, and 5pkgs. of seeds were exported to oversea markets during the same period. These were distributed as follows:—For London, 6,815 cases of apples, 2,549 cases of pears, 303pkgs. of honey, 8pkgs. of preserved fruit, and 2pkgs. of dried fruit; for Germany, 15,289 cases of apples and 4,393 cases of pears; for South Africa, 1,023 cases of apples and 260pkgs. of dried fruit; for India and the East, 3,501 cases of apples, 380 cases of grapes, and 106pkgs. of preserved fruit; for New Zealand, 626 cases of grapes, 100pkgs. of dried fruit, and 5pkgs. of seeds. Under the Federal Quarantine Act, 1,705pkgs. of plants, bulbs, seeds, nuts, etc., were examined and introduced from oversea markets. During the month of April, 1913, 11,192bush. of fresh fruits, 4,022bush. and 755 bunches (255bush.) of bananas, 6,326 bags of potatoes, 709 bags of onions and garlic, 2pkgs. of bulbs, 3pkgs. of plants, 4pkgs. of ginger, and 11 tree ferns were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885; 248bush. of bananas (over-ripe) were destroyed. Under the Federal Commerce Act, 4,417bush. of fresh fruits, 878pkgs. of dried fruit, 30pkgs. of preserved fruit, 66pkgs. of seeds, 1pkg. of honey, 1pkg. of nuts, and 10pkgs. of jam were exported to oversea markets during the same period. These were distributed as follows:—For London, 926pkgs. of fresh fruit, 403pkgs. of dried fruit, 5pkgs. of preserved fruit, 30pkgs. of seeds, and 1pkg. of honey; for Germany, 1,569pkgs. of fresh fruits; for South Africa, 275pkgs. of dried fruit; for South America, 16pkgs. of seeds; for Vancouver, 200pkgs. of dried fruits; for India and the East, 1,920pkgs. of fresh fruits, 25pkgs. preserved fruit and 10pkgs. of jam; for New Zealand, 2pkgs. fresh fruits, 1pkg. nuts, and 20pkgs. of seeds. Under the Federal Quarantine Act, 2,662pkgs. of plants, bulbs, seeds, nuts, etc., were examined and admitted from oversea markets.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

LETTUCE DISEASE.

Some diseased lettuces from the Hills gardens were submitted by the Agricultural Department to the Vegetable Pathologist (Professor Osborn, M.Sc.), who reports as follows :—

"The lettuces were infected with *Sclerotinia libertiana* (Fuckel), a fungus well known for causing 'lettuce drop.' The disease usually shows little if any indication of its presence in the earlier stages. Later the plants show yellowish watery areas at the lower part of the stem and on the bases of the leaves. The areas are soft to the touch, and white mould may be seen about them. The plant soon collapses and sinks into a shapeless mass. There is no method of saving an infected crop. All diseased plants should be collected and burnt. They should not be allowed to rot on the plot, nor in a rubbish heap. The fungus forms resting bodies (sclerotia) of an irregular shape, grey-black, and up to $\frac{1}{2}$ in. long. These remain in the soil, producing spores, or reinfecting another crop next season. The disease is not confined to lettuce plants, but occurs on other forced vegetables."

PLANTING CITRUS TREES.

"J. R. C.," Middleton, seeks information regarding the proper time to plant citrus trees, &c.

Reply—The Horticultural Instructor (Mr. G. Quinn) states.—1. *Time to Plant Citrus Trees.*—This depends much on the climatic conditions. If very slight or no frosts are experienced in the locality, and water for summer irrigation scarce, the best time is in the autumn, say end of March to middle of May. If, on the other hand, frosts occur in winter, and water is available for irrigating the trees in summer, the early spring time, say August to September, is the best period. These trees make two definite growths here, one in autumn, another in spring, and they should be transplanted just as the buds in the axils of the leaves begin to move, as indicated by a pale green

shoot pushing up. If the trees, however, have young, sappy, brittle growth, pinch it back to fibrous or tough wood. 2. *Breaking the Ball of Earth*.—If this earth is the natural ball, held together by the roots, do not break it. If, on the contrary, as is most often the case, the nurseryman has simply wrapped the roots in a ball of loose soil, the breaking away is of no consequence, but shows what the roots are like. If the ball is of this nature, then cut the top back severely, almost as with a peach tree when planting it. In fact, unless the trees are small and the roots well compacted in a natural ball of the nursery soil, the tops should be reduced considerably to make a balance, so to speak. 3. *Insects Eating Almond and other trees*.—Without a specimen, I can only conjecture what the pest is. From your description, I imagine it to be the curculio beetle; a leaflet with general information respecting this and other common garden pests can be supplied. 4. *Book on Gardening*.—I regret to say there is no good local work of an up-to-date character on gardening. The late Mr. E. B. Heyne wrote a small work called the “Amateur Gardener” many years ago, but although containing many valuable hints, it is necessarily out of date. I would advise you to obtain a few good works, such as L. H. Bailey’s “Principles of Fruit Growing,” 6s.; “The Pruning Book,” 6s.; “The Nursery Book,” 5s.; “The Principles of Vegetable Gardening,” 6s.; and “Garden Making,” 5s. These are all written in America, but they are the most instructive and suggestive books I know. With these carefully read in conjunction with your knowledge of local conditions, a good grasp of this many-phased subject should be secured. In this matter of books on fruit-growing with local color, a small “Fruit-growers’ Hand Book,” by H. McEwin, of Tasmania, 3s., and “Fruit Tree and Vine Pruning,” 1s. 6d., issued by this Department, may prove useful.

STOCK ENQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer).

A Hard Growth.

The Shannon Branch inquires what is the cause of a hard growth extending across the roof of the mouth of a horse so that the tusk presses upon it and causes pain. The horse is eight years old, and has always been hard-mouthed and free, but lately the pain is causing it to lose flesh.

Reply—It is impossible to tell the nature of the growth without making an examination of the mouth; but it is highly probable that it is a tumour caused by the irritation of the bit to some extent. Probably it could be removed by the knife, but it would be necessary to have a man well acquainted with the anatomy of the mouth and anaesthetics to do so.

Veterinary Books.

The Mount Barker Branch inquires names of veterinary books for library ; not too technical.

Reply—Among books which can be recommended are :—“ Horse Diseases ” and “ Cattle Diseases ” (U.S.A. Agricultural Bureau) ; “ Farmers’ Veterinary Adviser ” (Law) ; “ Live Stock Handbooks ” (Vinton & Co.) ; “ Veterinary Notes for Horse Owners ” (Hayes) ; “ Clater’s Cattle Doctor ” (Armitage) The lot could probably be bought for less than £5.

Effect of Phosphorus.

The Colton Branch inquires, “ What is the effect of phosphorus poison ” ?

Reply—As generally obtained by cattle from rabbit baits, the effect of phosphorus is that of a very acute irritant, with secondary effects on the nervous system. The symptoms are :—Great depression, acute pain in the belly, sunken eye, collapse, often severe and blood-stained diarrhoea. When not so acute the above are less marked, but there is ulceration of the mouth, salivation, and swelling of the fetlocks, with a paralytic sort of walk, and silly, staring expression, with great thirst. *Postmortem*—There is inflammation and often ulceration from the mouth to the vent, especially in the fourth stomach and small bowels, and in many cases such organs and the liver will have the characteristic smell of the drug, and shine in the dark. Turpentine, 1oz. or 2ozs., given in milk or with white of eggs, and followed by barley water or linseed tea relieves the symptoms. Oil of any sort must be avoided.

Fistula.

The Glencoe Branch again refer to fistula, and ask if an injection of spirits of salts is a good remedy. Also, if maggots in the wound will eat out the poison.

Reply—An answer to an inquiry from this Branch on the subject appeared in the March number of the *Journal*. Spirits of salts, or hydrochloric acid, acts as a severe caustic, and is not necessary, neither is it advisable. Maggots do live on the dead tissue, and so do good, but a clean knife will do much better.

Effect of Horse Treader.

“ R.T.,” Bordertown, asks what effect the horse treader has on the feet and legs.

Reply—The horse treader used in moderation has no worse effect on the feet and legs than any other class of work, but as soon as weariness sets in then the tendons of the leg feel the strain badly and break down. As a rule the feet are not much affected.

Probable After Effects of Influenza.

A member of the Clanfield Branch describes fully the symptoms of a horse that died, and seeks information. Briefly, the symptoms were—A year ago the horse had giddy fits and failed in appetite, had a spell, improved, resumed work, did well, went to Lameroo a few weeks ago, fell in the shafts and died; organs, except the lung, seemed healthy; fluid blood was found in belly. The horse also had fistulous withers for some time before death.

Reply—The symptoms point to an attack of influenza last year, followed by an abscess in the brain, with paralysis of the stomach. In the early stages ounce doses of Epsom salts twice a day in bran mash would have done good, and when the giddy fits were on relief would have been obtained by giving half an ounce of nux vomica and the same weight of flowers of sulphur in the food daily; but probably no treatment would have effected a cure. In examining the brain it is best to saw the head in two along its length; the removal of the brain entire requires anatomical knowledge.

Horses—Various Inquiries.

The Hartley Branch inquires the reason of horses blowing after a little work?

Reply—The most probable cause is that the horses are suffering from colds or influenza and require a few days spell with an ounce of Epsom salts in their food or water twice a day. If this is not the cause they are most likely exhausted on account of a sameness in their food, and it would be well to give them a change in the way of bran, oats, or, if possible, a little green food.

The same Branch asks—Should horses be kept from water after having overeaten grain?

Reply—No; they must be encouraged as much as possible to drink, and given 2ozs. to 4ozs. of baking soda in a quart of milk and several gallons of soapy water injected as enemas; they should be moved briskly about also. A horse secretes about 7galls. of saliva in 24 hours, and if he is not allowed to drink he has to find this moisture from his system, so slowing down the action of his bowels which require encouraging.

The Warcowie Branch inquires treatment of 7-year old buggy mare which has failed after a journey and suffers from swelling of neck, head, and belly with a little fever.

Reply—The mare has a form of influenza and should have a spell with light diet—bran mash, hay, or green food if available. Veterinary tincture of arsenicum, 10 drops with a little sugar or pollard on the tongue three times a day will probably be the best treatment, followed by similar doses of nux vomica when the swelling has subsided for a day or so.

"R. E. C.," Coomandook, inquires about cause of death of horse which was working all right on one day and died the next. The animal breathed hard, lay with mouth propped on the ground, was very stiff about the neck and limbs, and would not eat. If sand was the cause should not he have had stoppage? He passed both dung and water.

Reply—A horse may be badly sanded without showing symptoms of stoppage; but the symptoms in this case read more like those of lockjaw. If the haw or third eyelid covered half the eyeball this would be the disease which caused death, otherwise probably there was congestion of some large organ such as the lungs or liver which brought about collapse.

A member of the Forster Branch inquires in regard to the death of a horse which was ill from Sunday night till 10 o'clock Monday morning. Symptoms were frothing at the mouth, black tongue, lips very swollen, heavy sweat. He suspects snakebite.

Reply—From the symptoms one may well conclude that the cause of death was snakebite; but in all cases of sudden death like this it is advisable to inform the Chief Inspector of Stock, Adelaide, as soon as possible, as anthrax might exist and be a danger to other stock and man. In cases of known snakebite, the bite should be cut into and Condy's crystals well rubbed in as soon as possible. A few grains of the crystals dissolved in a pint of water may also be given as a drench.

"W. P.," Mount Barker, had a young, sound draught horse in good condition running in a paddock and found him one morning galloping about very distressed, sweat pouring off him, constantly switching his tail. He died two hours later. The head and neck were very swollen.

Reply—Probably a snakebite, the symptoms are compatible with this or poisoning from some plant; but a *post mortem* would have been necessary to find real cause of death.



A FARMER'S HORSE.

TYPE REQUIRED, AND HOW TO OBTAIN IT.

By F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

At the outset the writer wishes the reader to understand that the sentiments expressed in this article are purely personal, and in no wise official pronouncements. They are simply the outcome of a farmer's observations from the railway carriage window, or in the paddock during brief visits in which his attention is generally centred on a single individual, and the others merely get a passing glance; and it may be due to this that the general impression is that the average farm horse is markedly inferior to what it should be. Seldom can one say—

So did this horse excel a common one,
In shape, in courage, color, pace, and bone.

It may be stated without fear of contradiction that it costs no more to breed a good horse than it does to rear a poor one; therefore one naturally looks for some reasonable explanation for this mediocrity. This seems to be that the farm horse is looked upon as a necessary evil, rather than as an intrinsic factor in the profit-making mechanism of the farm. There are exceptions, and they are so noticeable that one may ignore them when dealing with generalities. At a horse sale at seeding time one often hears a remark such as this, "I must pick up one or two to make up the team, but they will have to be cheap." If the same man were going to buy an oil engine, he would probably say, "It must be good, even if it costs a few pounds more." But then the oil engine will have to be looked after, while the horse, as often as not, has to fend for himself. The owner will read up the instructions about the engine, and study economical feed; he will notice the early symptoms of faulty work, and give it a spell while he overhauls it. The horse will have a bag of chaff to eat or leave at his own choice, a bed of his own dung reeking with foulness upon which to rest, and the whip energetically laid on if his piston stroke is faulty.

An observer reading a paper at a recent Bureau meeting voiced his astonishment at the amount of care bestowed upon the farm horse in the old country, and concluded his remarks by the expression of opinion that farming in the old country did not seem to pay. There is probably a vein of truth in this

opinion, and it is the reason of the amount of care bestowed upon the horse, because it has been forcibly impressed upon the farmer that he cannot afford to neglect that important part of the farm machinery.

At some future time the writer hopes to offer a few data on the profit and loss of the mechanics of the farm horse, but now he would say that the worst horse in the team is the standard to which the others are lowered in their work: the slowest sets the pace for the fastest. When Gresham enunciated his law that bad money drives out good, the British farmer was already aware of its application to horseflesh, but he did not ask for Government vets. or Government subsidies to breeders. Realising perhaps that Government expenses come out of the taxpayers' pockets, he determined to raise the average horse to the standard of the best, with the result that it was worth while to look after the horse, and all nations were ready to compete for his Clydesdales and Shires, till perhaps both he and they waxed exceeding fat, and Cousin Jonathan began to be dubious about paying for masses of silky hair which hid up round and doubtful bone, and pitched his dollar against activity rather than appearance. Apparently, however, it has taken John Bull and Sandy many years to realise this, for it is only in the Home exchanges just to hand that one reads of a famous breeder of Shires enunciating a few plain facts for his hearers to ponder over; and Clydesdale breeders admit that show ring fashion has woefully deteriorated the qualities which brought the breed into prominence.

THE FACTOR OF ENVIRONMENT.

Local environment is doubtless the factor which determines characteristics that are evolved in the short time in which a special breed is fixed in type. The heavy loams of Lincolnshire and the shires were the occasion for the heavy-muscled, strong-limbed Shire horse, while the hills and dales along the Clyde influenced the evolution of the strong-framed but more active Clydesdale. Neither of these conditions exist in South Australia, yet the Clydesdale and the Shire—sometimes, one must admit, most fearfully caricatured—are the types that are favored for a country in which the paddocks are level, or if on the rise, very light to work, where the depth of the furrow is shallow, and speed is essential to tillage. No doubt home ties have a preponderating influence in this choice, and a reverential awe for that blessed word “imp.”

COMPULSORY REGISTRATION.

South Australia has not been content to follow a lead in other lines. Her wheat and her barley, her apples and her wines lead by their excellence and their distinctive qualities; but in the matter of draught horses it is greatly to be feared that she cannot stand up to her neighbors, who, in the matter of sales, have remembered the legal maxim, “Let the buyer beware,” and “imp.” is near akin to “deil.” The writer holds no brief for compulsory

registration of stallions, believing as he does that personal interest is a more potent factor in improvement than compulsion, in horse-breeding as well as in sobriety. He would, however, point out that neighboring States having found the advantage of a hall mark for sound sires, South Australia became the dumping ground of their locally unsaleable rejects, and loyal support of the scheme now in force by the Stock Department will redound in pecuniary benefit to the breeder and user, until such time as an uniform method of registration shall be in force throughout the States of the Commonwealth.

THE PROBLEM.

Thus far the picking out of notes has been an easy task ; the primrose path of destructive criticism is seldom difficult, but the rugged road of reconstruction is a matter of work—*hoc labor est*, as old Virgil puts it. Still, when one thinks that but a generation ago Gawler was the southern bound of illimitable desert, and but a few years later Crystal Brook was looked on much as Æneas regarded the Stygian stream, surely the offspring of men who went out and “made the clods of the valley to laugh and sing” are men who can evolve a breed of draught horses sound in wind and limb, active and staunch, which shall bring South Australia to the forefront when men are seeking horses to work and wear —

Round-hoof'd, short-jointed, fetlocks shag and long ;
Broad breast, full eye, small head, and nostril wide ;
High crest, short ears, straight legs, and passing strong ;
Thin mane, thick tail, broad buttock, tender hide ;
Look, what a horse should have he did not lack.

SOME ESSENTIALS.

That is compactness, strength, endurance, and quality, courage, color, pace, and bone, to obtain which will involve careful selection and equally careful weeding out. At present any female equine is considered good enough to breed from, and as the tendency of all crossing in Australia is length of bone, the compactness of the foundation mares is, perhaps, next to soundness, the main essential, for it tends to strength, in so much that large short masses of muscle are far more powerful than equal bulk in length. This, in turn, tends to endurance, because the work of such muscle is carried out at far less cost to the system ; to quality, because lankiness is always accompanied by slackness in coupling and raggedness in bone ; to courage, because ease in work overcomes weariness ; to color, because “a good horse is never a bad color ;” to pace, because a sound muscular system terminates in strong tendons, short and stout ; to bone, because compact, firm ivory bone is essential to the insertion of strong, active muscle.

One must eliminate as soon as possible the daylight, which is year by year increasing in visibility, below our draught stock. Because a horse is 17 hands or over it is no reason for his being stronger than a 15-2. Every ounce at the hoof is a pound at the shoulder, so that he will tire the more readily,

and his bone will naturally be more open and spongy, which means a tendency to roundness—only another name for bone that lacks ivory-like firmness. And in the fashion for hair, which has proved the downfall of the Shire and Clydesdale in the foreign markets, one only sees a mask for round bone. For, if one puts the question fairly, without prejudice, one is bound to admit that the only use for hair is to catch the judge's eye to give the semblance of solidity and strength to the four supporting columns of the hefty body ;



TYPES OF PERCHERONS.

and one is equally bound to allow that this hairy jungle has hoodwinked many a man who should have trusted to his hand rather than his eye, in addition to putting many pounds at the wrong end of the steelyard which has to weigh up effectiveness in a day's work.

Then, how often one sees in South Australia a weighty fiddlecase, which is euphoniously described as a strong head, which in turn would be strong

in proportion to the fineness of its bone and the cleanness of its outline. Coarseness in any part of a draught horse never stands for strength, and, perhaps, nowhere is this more emphasized than in the bones of the head. Below the knee there must be flat bone, and a look at the head will often tell whether this is so or not, and when a man says it is not important in a draught horse, avoid him if he is a seller; equally give him a wide berth if he is a buyer, unless there are culls to be got rid of.

THE TYPE REQUIRED.

But one British breed has retained the characteristics of "the Flanders mares, which rob us"—the Suffolk Punch. Much, however, as one must admire the shapely chestnuts, one cannot help regretting that below the elbows and the stifles one must be lenient in criticism, and both color and constitution unfit them to be the type that South Australia wants. There is too much of the Flemish temperament, which, without injustice, may be deemed a mixture of coquettish indolence, leading to softness and to loss of pace. The brisk gaiety of the Clydesdale and the staunch heftiness of the Shire must be retained, but tonnage must be reduced and speed increased. The climate calls for it, conditions of tillage warrant it, and many a German farmer in South Australia has shown the advantage of packing a big horse into a small carcass, which, in brief, is what our type must be.

The forefather of the Shire—the old British warhorse—could gather way in the tournament with 20st. or more upon his back, and has not lost his vigor with the Flanders cross; but the increase of bulk, desirable enough in his own home, is no proportionate gain here; nor is the flattery of the imitation of the Clydesdale in rounding bone and flowing feather a desirable importation.

It may be that we have enough mares of the right stamp to start our breed with, but it is much to be feared that a high percentage of them will transmit to their progeny bones which are not anatomical; and in our own interests we must rigidly insist on soundness as well as shapeliness. This, then, will cut down our available material to so small a quantity that, without outside aid, the building of a breed will be a painfully slow process; while, with the glamour of "imp." around the male, we are often blinded to the fact that the best thing to do would be to train up a band of castrators and let them loose to wreak summary vengeance on most of our stallions, always saving the honorable, but few, exceptions. Naturally such a proceeding would not do much to building up a breed; but, granting that in a season the stallion's influence is 50 to 1 on the mare's, it would do much to eliminate the undesirable and increase the wished for, and need not create a monopoly, as some would fear, for nature herself would see to that by limiting the fertility of the scarce stallion, and the laws of supply and demand would automatically come into action to prevent any one man from dominating the new breed.

Therefore, one would have to eliminate "imp." and substitute "imported," in a few cases at all events, to make up for the loss of the discarded ones ; and it would be found that there are zones of country in America and France that will offer climatic and telluric similarities to South Australia, though it is doubtful whether they can equal it in opportunity. But in such zones one can find the class of horse which seems to fill the bill—a strong, compact beast, very weighty for its appearance ; solidly built, and set up on clean, flat, hairless legs ; pleasant in temper, and equally at home in the walk or the trot, with sound strong hoofs—the outcome of years of Government inspection ; and iron greys, rich browns, or glossy blacks—all wearing tints. They are little gold mines to their owners in their native district in France, and have so caught the fancy of the practical American that they have become the leading breed for farm draught across the Atlantic, and are probably only awaiting the opening of the Panama Canal to rejoice the heart of the horse lover in South Australia. Very nearly related to the Flemish breeds, which gave the Shire and Clydesdale size and weight, they are even more nearly akin to the active war horse which bore down the Saxon bowmen as their riders charged up the hill at Senlac, and then kept at stud by their Norman lords, produced by crossing with the English pack mare the charger of the *haute école*, or the teamster that dragged the woolpacks over the Yorkshire dales before the mills of Bradford had opened their voracious jaws for the produce of the world.

Such is the Percheron, a fit model for sunny South Australia to keep in mind, and one which would influence our farm horse stock for nothing but good if some of our enterprising breeders would but get over a few, or some philanthropist present a stallion and half a dozen mares to a public institution such as Roseworthv.



A USEFUL FIELD ROLLER.

THE HOG INDUSTRY.

THE EXPORT TRADE.

(By G. A. W. POPE, General Manager Government Produce Department.)

The question of the establishment of an oversea trade in pork (frozen or cured) is one that has been before this Department during the whole of its history. The first shipment of frozen meat from South Australia contained pork, and periodically we have since been forwarding experimental shipments with varying success; but never during the whole of the 18 years has there been any sufficient development to establish an export trade.

The reasons are that in earlier years London values were too low, and this knowledge has retarded the natural increase, above local requirements, which can only take place by the establishment of a payable oversea market; so that to-day there is no surplus available with which to exploit what now appears to be a favorable opportunity of realising a long desired opportunity of feeding an English market capable of returning shippers payable prices.

RAISING PIGS.

Broadly stated, it is generally considered that the producer requires an average return of 4d. a pound let to successfully raise pigs, and the fluctuations of our local market plainly show that it is not a very difficult matter to produce the pigs if the periodical scarcities warrant it, but the rapidly following gluts emphasize the unstable nature of the undertaking.

This state of affairs is a sign that, like most other classes of produce, Australia can produce pigs in abundance, but without oversea outlets local markets do not offer that continuity of demand which is essential to a prosperous business. On the other hand, it is almost certain that if a shipping trade were developed production would expand, and this would have the good effect of levelling up the local market, preventing the necessity for the present exorbitant price of bacon, and add a source of further income to a section of our producers who are not now obtaining full value for the feed that would produce pigs.

The Advisory Board of Agriculture has discussed and made recommendations to further endeavor to push the export trade, and the other States are so keenly studying the problem that a suggestion was tabled at the last

Ministers of Agriculture Conference suggesting that all the States should combine to secure the services of a consulting bacon expert with a thorough knowledge of the English market requirements.

THE PROPER METHOD OF SHIPPING.

It is now generally considered that the trade should be developed with bacon, instead of shipping fresh pork in a frozen condition. England pays oversea suppliers approximately £25,000,000 yearly, and as Australian bacon is at present realising from 60s. to 65s. per hundredweight in England, there is a prospect of building up our industry and participating in the trade.

BRITISH EMPIRE TROPHY FOR BACON.

The British Dairy Farmers Association of England has decided to create a special class at their annual shows to be held in October next for bacon cured anywhere throughout the British Empire, and offers an Empire trophy for the competition.

The Trade Commissioner and the management of this Department have made special recommendations, pointing out that this offers a splendid opportunity to collect a volume of information as to the class of bacon required for the trade and market values, should a trophy be forwarded from South Australia. The Hon. Minister of Agriculture, has decided, therefore to pay the expenses of all intending competitors, as an inducement for them to undertake the preparation of the bacon and in order to obtain the advantages that such a trophy would be to the industry.

Each individual exhibit must consist of two sides of bacon smoked, and two sides of bacon pale dried, and the weights must not be less than 56lbs., and not more than 68lbs. per side. Major Norton has forwarded a complete statement of all other details which must be observed in preparing the bacon, and all who would care to exhibit are invited to communicate with this Department, when the fullest information will be supplied.

SOME STATISTICS.

In view of the importance of the subject dealt with by Mr. Pope, the following figures showing the number of pigs in the State for the six years 1906-11, and the fluctuations in the price of baconers during the last 19 months should prove of interest.

NUMBER OF PIGS IN SOUTH AUSTRALIA, 1906-11.

1906.	1907.	1908.	1909.	1910.	1911.
111,240	90,741	78,454	80,410	96,386	93,130

PRICES OF PRIME HEAVY BACONERS ON DATES QUOTED.

1911.

October 4th, 55s. to 66s. ; November 1st, 42s. to 48s. ; December 6th, 41s. to 46s.

1912.

January 3rd, 45s. to 50s. ; February 7th, 43s. to 47s. ; March 13th, 46s. to 53s. ; April 3rd, 43s. to 49s. ; May 1st, 53s. to 58s. ; June 5th, 59s. to 66s. ; July 3rd, 60s. to 68s. ; August 7th, 65s. to 70s. ; September 4th, 70s. to 88s. ; October 9th, 82s. to 96s. ; November 6th, 73s. to 86s. ; December 4th, 75s. to 85s.

1913.

January 8th, 73s. to 85s. ; February 5th, 84s. to 95s. ; March 5th, 68s. to 74s. ; April 2nd, 72s. to 80s.

Although the above figures show an appreciable average increase, they also demonstrate the fluctuations in prices, due largely to a limited market.

TESTING MILK AND CREAM.

By H. J. APPS, Dairy Officer.

(Continued from page 664.)

In testing cream the procedure is very little different from that followed in testing milk. There are various forms of samplers in use, but that which is most satisfactory is the ordinary glass cylindrical tube in which is inserted a plunger. The average diameter of the core is from $\frac{1}{2}$ in. to $\frac{5}{8}$ in. In taking a sample, hold the plunger stationary and gently push the glass tube to the bottom of the can, then withdraw the sampler from the cream and remove any cream that may be on the outside of the glass tube. Place a finger at the end of the tube to prevent any of the cream running out, and transfer the sample from the tube to the supplier's bottle or mug by gently pushing the plunger downwards.

Should the glass tube be merely allowed to remain on the surface of the cream and the plunger drawn upwards until a sufficient quantity for the sample is secured, probably the results will not be correct, for cream upon standing for any time is higher in percentage of fat nearer the surface than

at the bottom, for the heavier portion of the cream, viz., the milk, will gradually settle at the bottom. The glass tube should be freed from any cream from the previous sample before being used again.

PREPARING THE SAMPLE.

The cream should be heated to 90° F., as with milk, and uniformly mixed, the measured or weighed quantity then being taken. Undoubtedly the most correct method is to weigh the cream, for often when the fat column of a measured quantity is compared to a weighed one there is a variation. The weighed sample may be greater in percentage of fat than the measured one. This may be due to the cream being badly fermented or tainted, whereby it becomes greatly impregnated with gas, which will materially influence the weight of the volume of cream taken when measured by the pipette. Again, a measured quantity of very rich cream will weigh less than a measured quantity of cream low in fat column, because cream low in fat contents will contain more milk, consequently the specific gravity will be greater.

As the neck of the cream flask is only graduated to hold 30lbs. only 8.75c.c. half the quantity when testing milk should be taken. The cream being at the correct temperature, viz., 90° F., and evenly mixed, draw up 8.75c.c. by means of the pipette, or weigh off 9 grammes by means of the cream scales. When using the pipette transfer the cream to the test flask: then draw up a pipette full of lukewarm water, allow half of this quantity of water to run into the cream flask, then place a finger at each end of the pipette and gently agitate it to remove all traces of cream within the tube, and finally allow this also to run into the test flask. The next step is to reduce the temperature of the cream within the flasks to from 65° to 70° F. Then add sulphuric acid at the same temperature, using 17.5c.c. Generally a slightly less quantity of acid will be sufficient, as there is less solid matter to dissolve in cream than with milk. When all flasks have been so treated, gently shake them until all traces of curd have disappeared. The flasks may now be placed in the machine for five minutes. At the end of this time water at a temperature of 180° F. must be added, sufficient to bring the contents of the flasks up to the shoulder portion of the neck of the bottle; again set the machine in motion, whirl for one minute, stop and again add hot water to bring the volume of the flask to within half an inch from the top of the neck, and finally whirl for another minute, when the test is complete. Immediately the machine has become stationary the fat column may be read off.

The neck of the flask is graduated into 30 spaces representing 30lbs., and each division is further divided into two representing .5, or $\frac{1}{2}$ lb. When the fat column is measured off the result must be doubled. Thus, should the fat column read 24 on the neck of the flask, the cream will contain 48 per cent.

of butter-fat. In estimating the percentage of fat when weighed samples are taken, multiply the reading of the fat column obtained by 18 and divide by the weight taken.

SKIM AND BUTTER MILK.

Skim-milk and butter-milk are dealt with in the same manner as ordinary milk, with the exception that a special double-necked flask is used, and instead of 17.5c.c. of sulp. acid, 20c.c. is taken, as there is more solid matter present than with ordinary milk. The graduations of the neck of the smaller calibre range from .01 to .25 of 1lb., and each division represents .01 of 1lb.

Whey is tested in the same flask as skim-milk, and tested exactly the same as is milk, excepting that only 9c.c. of sulp. acid need be used, as practically all the curd is retained in the cheese.

To estimate the pounds of butter-fat in milk, multiply the test by the pounds of milk and divide by 100.

Example—260lbs. of milk testing 4.1 per cent. of butter-fat. Find the total amount of butter-fat—

$$\begin{array}{r} 260 \\ 4.1 \\ \hline 260 \\ 1040 \\ \hline \end{array}$$

100)1066.0(10.66lbs. of butter-fat.

ESTIMATING THE COMMERCIAL BUTTER IN MILK.

Commercial butter differs from ordinary butter-fat in so much as it contains—

$$\begin{array}{lcl} 12 \text{ per cent. to } 14 \text{ per cent. of water} & \} & \\ 2\frac{1}{2} \text{ per cent. to } 4 \text{ per cent. of salt} & \} & \text{Equal to } 17\frac{1}{2} \text{ lbs.} \\ \frac{1}{2} \text{ per cent. to } 1 \text{ per cent. of curd, \&c.} & \} & \end{array}$$

This 17½lbs. is called over-run in butter; thus, cream containing 100lbs. of butter-fat should produce 117½lbs. of commercial butter. In estimating the commercial butter in milk .22 is deducted from the test for loss of fat in skimming and churning; then multiply the quantity of milk by the test minus .22, divide by 100, and add 17½ per cent. over-run.

Example—260lbs. of milk testing 4.1 per cent. of butter-fat. Find the total commercial butter.

$$\begin{array}{r} 4.1 \qquad 260 \\ .22 \qquad 3.88 \\ \hline \end{array}$$

3.88 100)1008.80(10.08 plus 17½ per cent. = 1.76lbs. over-run on 10.08lbs. butter-fat, or a total of 11.84lbs. commercial butter.

COMMERCIAL BUTTER IN CREAM.

In estimating the amount of commercial butter contained in cream, multiply the weight of the cream by the test, divide by 100, and add $17\frac{1}{2}$ per cent. over-run.

Example—406lbs. of cream testing 46 per cent. of butter-fat. Find the total amount of commercial butter.

406

46

186·76lbs. butter-fat + $17\frac{1}{2}$ per cent. over-run = 32·68lbs. of over-run
in 186·76lbs. butter-fat, or a total of 219·44lbs. commercial butter.

It is no unusual occurrence to hear it remarked that certain cows test 6·4 per cent. of butter-fat, and this is invariably quoted as a criterion to her value. The test is really no true guide to the value of the cow unless the quantity of milk is taken into consideration. I have heard of instances where cows have been discarded failing to test over 4·0 of butter-fat, irrespective of the amount of milk they were yielding. In one particular instance where this was brought under my notice the herd was not kept for a town supply, but the produce forwarded as cream to the factory.

The idea of testing is to arrive at the full amount of butter produced for the full lactation period. Often cows producing at one period a maximum of from 14lbs. to 16lbs. of butter in a week will not equal the total product for the full lactation time of a consistent cow whose maximum does not exceed 10lbs. to 12lbs. of butter in any one week. This will be seen from the following example :—No. 1 cow, yearly record 520galls. of milk testing 5 per cent. butter-fat, producing 293·06lbs. commercial butter; No. 2 cow, yearly record 680galls. of milk testing 4 per cent. butter-fat, producing 302·02lbs. commercial butter.



MANURIAL TESTS.

SADDLEWORTH.

[Conducted by Mr. Fredk. Coleman.]

For the eighth successive year Mr. Coleman has conducted manurial tests on his farm "Tuela," Saddleworth. The plots, 16 in number, are half an acre in area. One-half of these are used each year, while the other half remain fallow, care being taken that the plots are placed in precisely the same position each alternate year. The results are set out in the following table:—

YIELDS FOR EIGHT YEARS.

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.	Plot 7.	Plot 8.
	1cwt. Manure Super. per Acre.	1cwt. Manure Super., 5cwt. Lime per Acre.	1cwt. Mineral Super., 1cwt. Sulph. Potash, 1cwt. Nitrate of Soda per Acre.	1cwt. Bone Super. per Acre.	No Manure.	1cwt. Mineral Super., 1cwt. Sulph. of Potash per Acre.	1cwt. Sulph. Potash, 1cwt. Nitrate of Soda per Acre.	1cwt. Mineral Super., 1cwt. Nitrate of Soda per Acre.
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.
1905.....	31 0	29 22	33 48	34 36	29 50	35 6	30 38	33 10
1906.....	32 20	34 10	32 22	33 56	23 40	33 34	24 42	36 8
1907.....	35 42	38 2	39 8	36 22	24 52	35 32	25 16	35 50
1908.....	17 38	19 28	20 52	17 34	7 36	19 36	8 50	18 52
1909.....	31 42	32 54	35 6	30 40	24 32	29 34	23 18	33 34
1910.....	21 4	22 26	25 20	26 24	15 12	28 44	15 28	29 38
1911.....	21 54	24 0	24 40	24 44	15 30	24 6	15 34	20 40
1912.....	23 31	27 22	27 50	28 56	12 58	26 14	29 36*	23 58
Averages 8 years ..	26 51	28 31	29 53	29 9	19 16	29 3	20 32*	28 58

* Seven years only; dressed with 2cwt. super. in 1912.

The rainfall from seed time (May 21, 1912) to harvest (January 2, 1913) was 12.63 inches.

The increased yields from the manured plots over the return from that which was not dressed in any way (Plot 5), in 1912, were as follows:—

Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.	Plot 7.	Plot 8.
bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.
10 36	14 24	14 52	15 58	—	13 16	16 38	11 0

*Plot No. 7, which from 1905 to 1911 inclusive, had received $\frac{1}{2}$ cwt. sulphate of potash and $\frac{1}{2}$ cwt. nitrate of soda, in 1912 in place of this dressing was given 2cwts. of mineral super. per acre. This plot yielded the largest increased return over that of the unmanured plot, and Plot No. 4, dressed with 1cwt. bone super. came next.

VALUE OF INCREASED YIELD, 1912.

The following table shows the value of the increased yield at 3s. 5d. per bushel, and after the deduction of the cost of the manure, the net increased value of the return over the unmanured plot for the year 1912:—

Table 2.

Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8
£ s. d. 1 16 2 0 4 0	£ s. d. 2 9 2 0 9 10	£ s. d. 2 10 9 0 18 0	£ s. d. 2 14 6 0 5 6	£ s. d. — —	£ s. d. 2 5 4 0 11 0	£ s. d. 2 16 10 1 2 0	£ s. d. 1 17 7 0 11 0
1 12 2	1 19 4	1 12 9	2 9 0	—	1 14 4	1 14 10	1 6 7

As was previously the case, Plot No. 4, dressed with 1cwt. of bone super. per acre, returned the greatest net increased profit, viz., £2 9s. Plot No. 2 again occupied second place with a return of £1 19s. 4d.

The result of the application of 2cwts. of mineral super. to Plot No. 7 is worthy of note. Previously this plot received $\frac{1}{2}$ cwt. sulphate of potash and $\frac{1}{2}$ cwt. nitrate of soda, and the net result was a loss of 13s. 9d. per acre on last year's crop. With the substitution of 2cwts. of super. per acre this plot returned a net increased yield worth £1 14s. 10d.

TOTAL INCREASED PROFIT OVER UNMANURED PLOT.

Over a period of 8 years (with the exception of Plot No. 7 which is for 7 years) the results are as follows:—

Table 3.

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 6.	Plot 7.	Plot 8.
	b. lbs.	b. lbs.	b. lbs.	b. lbs.	b. lbs.	b. lbs.	b. lbs.
Increased yield over unmanured plot for 8 years.....	60 44 £ s. d.	73 52 £ s. d.	84 56 £ s. d.	79 2 £ s. d.	78 16 £ s. d.	2 31 £ s. d.	77 40 £ s. d.
Value at 3s. 5d. per bushel	10 7 6	12 12 4	14 10 2	13 10 0	13 7 5	0 8 9	13 5 4
Value of manure	1 12 0	3 18 8	7 4 0	2 4 0	4 8 0	4 18 0	4 8 0
Net value of increase for 8 years	8 15 6	8 13 8	7 6 2	11 6 0	8 19 5	Loss 4 9 3	8 17 4

From this it will be seen that, taken over a period of 8 years, a dressing of 1cwt. of bone super. to the acre, (*vide* Plot No. 4) has been the most profitable.

APPLE-GROWING IN TASMANIA AND VICTORIA.

A VISITOR'S IMPRESSIONS.

[Paper read by Mr. W. L. SUMMERS at a meeting of the Blackwood Branch of the Agricultural Bureau.]

TASMANIA.

Fruit-growing in Tasmania really means apple-growing, as, although large quantities of berry fruits of very fine quality, plums, &c., are produced, apples are the mainstay, and the planting of apples is being very rapidly extended. Before dealing with this fruit a short reference to apricots and pears may be of interest. Pears appear to be lacking in flavor compared with those grown in this State. So far as size and color are concerned the apricots grown near Hobart were superior to anything I have seen in this State, but the rich sugary flavor so characteristic of well-grown apricots from our own district was lacking. Probably the colder conditions on the island are not conducive to the development of fruit sugars in the apricot.

In regard to apples, it sounds queer when travelling with experienced men to hear again and again the remark, "That land is only fit for apples," as though the worst was good enough for apples. Another common remark was, "Plant apples on poor land with a good subsoil; on good land you get plenty of wood and little fruit." A very large proportion of the orchards are on what would undoubtedly usually be classed as indifferent soils, that is, light loams to even poor (in appearance at least) sandy soils over a clay subsoil.

A DIFFERENCE IN YIELD.

Speaking generally, I believe I am within the mark in saying that the average apple yield per acre in Tasmania is probably 50 per cent. greater than in this State; 350bush. to 400bush. per acre is considered a good crop to average from established trees. The official statistics show that there are approximately 26,000 acres of apples in the island, and of these about 12,000 acres are over eight years old. The total crop last year exceeded 2,000,000bush., but this year it is expected to be fully half a million bushels short. It may be asked why there should be this difference in yield here and in Tasmania. The Tasmanians will probably say the country is better suited to apple-growing;

and, while it may be somewhat rash to hazard any opinion without very thorough inquiry, I am inclined to think that climate is only one, and not the most important, factor. There can be little doubt that the climate, which is more even and cooler than in this State, tends to more regular cropping and also heavier crops. For instance, light rains, cool nights, and heavy dews throughout the summer months must help to the production of larger fruits. The lower range of temperature probably causes more regular growth and better development of fruit buds. I think, however, the selection of varieties particularly adapted to the climate and soil is a far more potent factor in these heavy yields. Any orchardist from this State cannot fail to be struck by the limited number of varieties grown in the great majority of the orchards, and also that the favored varieties differ in different districts. Here is where I think South Australian growers have much to learn. Most of our older orchards contain a large assortment of fruits, due probably to the fact that they have been chiefly planted for the local markets. In Tasmania the great proportion (probably 90 per cent.) of the apples grown are exported, consequently a limited number of those suitable for export have been planted.

THE POPULAR VARIETIES.

Of these varieties the Sturmer Pippin is without doubt the most largely grown, and is probably the most profitable on the whole. It is a heavy and regular cropper, a good keeper, and develops color and flavor far superior to anything I have seen here. Possibly the Cleo. (N.Y.P.) ranks next in matter of extent of planting, though once away from the Sturmer there is not the same difference. Other varieties planted on a large scale which do well are Jonathan, Cox's Orange Pippin, Scarlet Nonpareil, Adam's Pearmain, French Crab, &c., but these are not suited to such a wide range of country as the Sturmer. In some parts the Scarlet Nonpareil is a wonderful bearer of fruit of large size and flavor; in other parts it is not grown at all, because two or three others do better. The same, of course, applies to the other varieties mentioned. The specialising in varieties suited to the soil and climate of a particular district is, I believe, essential to the production of maximum crops, and also in the production of the highest degree of quality in the fruits. This limitation to three or four varieties also has another bearing on yields, that is, the grower is naturally able to study the trees thoroughly and to realise just what treatment the particular varieties require to enable them to yield regularly.

Speaking generally, the trees on the so-called poor soils are relatively small, very symmetrical in shape, and closely spurred from top to bottom. On the heavier soils a different system of training is adopted. In several localities I saw thousands of Cleopatra and Jonathan trees, which in shape and appearance, so far as the main leaders at three to five years old were almost identical with what we had in our own orchard a few years ago. The

system of pruning adopted was very much the same, but the results were vastly different. Hard pruning of the leaders and summer pruning of the laterals on our young trees resulted in strong growth and little fruit; in Tasmania they get short spurs and fruit right to the main arms. This difference in results, in my opinion, is due to the difference in soils and climatic conditions.

VALUE OF ORCHARD LAND.

One conclusion I have come to after two visits to Tasmania is that we do not appreciate in this State the real value of orchard land. Hundreds of acres of heavily timbered land are being sold in Tasmania for apple-growing at prices up to £20 to £30 per acre. Clearing costs anything up to £40, and the land is frequently on steep hill slopes, which must make working expensive. Three and four year old orchards are being quoted at £90 per acre, and those in full bearing at £150 or more. In this State we have thousands of acres of equally suitable land, with a good rainfall, within 25 miles of Adelaide. Much of it is wholly or partly cleared, and the cost of clearing generally would, on the average, be little more than half the cost in Tasmania. The slopes are much easier and consequently cheaper to work. I believe thousands of acres of this land could be brought into full bearing at the price it is costing many Tasmanians for their land by the time it is ready to plant.

Planting is going ahead rapidly. The area under apples has doubled during the past seven or eight years.

DONCASTER, VICTORIA.

Probably the largest fruit-producing district in Australia is at Doncaster, where approximately 7,000 acres are under cultivation within about five miles of the centre of the township. Growers have a splendid market for their fruit at their doors, as Melbourne is only 11 miles distant, while they also have the advantage of being within two days of the best market in Australia, i.e., Sydney. The natural result is that local requirements are catered for rather than oversea export, and a wide range of fruits are grown. The climatic conditions generally appear to be similar to that of this locality, except that they are more exposed to north winds and also more subject to spring frosts. Here, as elsewhere, there is a steady increase in the area under trees, and land values are high.

Growers in South Australia can learn a great deal from the methods adopted at Doncaster. Three points in particular are worthy of special notice.

WINDBREAKS.

The first thing that strikes one on entering the district is the general adoption of *Pinus insignis*, or Remarkable pine, as a windbreak. The country is undulating and broken into many small valleys, mostly with a gentle

slope. Being elevated above the plains, much of it is exposed to winds, which do great damage in the unsheltered orchards. For the protection of the orchards the Remarkable pine is used with scarcely an exception. One would naturally expect, with such strong-growing trees in close proximity to fruit trees, that the latter would suffer severely, but with few exceptions I saw little sign of this. In quite a number of instances I saw fruit trees within 20ft. of the inner row of pines well over 30ft. in height, and a close examination failed to show any marked difference in growth between the row of fruit trees nearest the pines and those 60ft. or more away. On inquiry of one of the most progressive growers in the district on this matter, he expressed the opinion that the pines, being planted close together, send their roots down instead of along the surface; and further, the fruit trees being occasionally irrigated during the summer, would assist them to withstand any ill effects that would otherwise result. The pines are planted in double or single rows. In the former case the trees are from 16ft. to 24ft. apart in the rows, and 6ft. to 8ft. between the rows. With single rows the pines are usually 10ft. to 16ft. apart. The general practice is to plant the pines the same year, or later than the fruit trees. Where fruit trees have been planted near established pines, those within 30ft. to 40ft. of the latter make but little growth. There can, however, be no question of the immense value of these windbreaks, even where trees cannot be planted nearer than 40ft., and it is difficult to see why the same success should not be obtained in this State. Where pines, or, indeed, any other tree, is used for this purpose, I would advocate subsoiling the land to encourage deep rooting, and each year in early spring to plough to a depth of at least a foot midway between the pines and the nearest row of trees to break any roots that may be encroaching on the orchard.

IRRIGATION.

Another prominent feature of this district is the utilisation of the surplus waters for irrigation. In nearly every orchard there are one or more hillside dams fed from the small creeks and from the roadsides. It is nothing unusual to find two or more such dams on a single holding, and where necessary the water is pumped from a lower dam where a plentiful supply is caught to one commanding the higher parts of the orchard. These dams vary in size according to location, and probably to the financial position of the orchardist, from a 200,000gall. capacity to over two millions of gallons. The cost varies, but £40 or £50 is considered a reasonable figure for a dam holding half a million gallons. The water is used to irrigate those trees carrying a heavy crop. In a very dry summer, such as is being experienced round Melbourne this year, two good waterings are sufficient. The application of 500galls. of water to a well-laden tree has a marked influence on both yield and quality, so that a dam costing £40 to £50 will suffice to irrigate from eight to 10 acres.

Allowing for the cost of distributing the water, it is fairly safe to say that the increase in the yield would pay in a single year for the cost of such a dam. Growers in this State certainly fail to make the best of their opportunities in the matter of water conservation. Last year most of us had a fairly costly demonstration of what a dry summer on heavily-laden trees means.

COLD STORAGE.

The third point to which I would refer is the use of cold storage for fruit. At Doncaster the Victorian Government erected a large cool store, and this was so successful that there are now four or five private stores in the district, besides a number in other parts of the State. The charge at the Government store is 1½d. per case per week from January 1st to May 31st, and 1d. per case per week for the rest of the year. The benefit of such a store to the growers is incalculable. Just think what it would mean if, instead of rushing our soft fruit to the market as it ripens, irrespective of whether the market is glutted or not, we could put it into a cool store at Blackwood for 10 or 12 days. The cost would be 3d. per case, but instead of having to take "jam" prices we would get steady rates. Then how often we have a glut of a particular sort of peach one week and a shortage within 10 days, with a rise of several shillings per case. Also, with our late apples and pears a cool store would be of immense advantage, as the loss in cool store is very little, provided the fruit is carefully handled. The difference in the money value of these losses and losses in ordinary orchard stores would probably pay the cost of storage several times over, and at the same time we would get the benefit of enhanced prices which rule in September, October, and November for these fruits.

In Victoria a number of the larger orchardists run small cool stores of their own, and I made some inquiries as to cost. To erect a store capable of holding 10,000 cases would cost less than £4,000, and the average cost per hour, using a 39 B.H.P. suction gas plant, would be about 5d. per hour. Economy is achieved by bringing the fruit in in the cool of the morning instead of in a hot afternoon.

A smaller cool store to hold about 3,000 cases would cost about £1,100 to £1,200 to construct, and would, I feel sure, prove of great value in this district. It would cost very little to run, and with the orchards planted in this locality there should be no difficulty in obtaining the necessary support. The cost of erecting eight separate storehouses of the usual orchard type would total nearly as great as that of the cool store, and the results far less satisfactory.

EXPLOSIVES IN AGRICULTURE.

INTERESTING CORRESPONDENCE.

The use of explosives in cultural operations has occupied considerable attention in the United States and South Africa. In the latter country in 1912 a number of demonstrations of the use of dynamite in agriculture were given. These were attended by large numbers of farmers and attracted a great deal of interest. So far as this State is concerned, beyond isolated experiments mainly for the purpose of breaking up the hard clay pan caused in some places by tillage at a uniform depth and the frequent watering of fruit trees, not a great deal has, so far as is known, been done in the way of carrying out the practice. That it, however, has not escaped the attention of local producers is shown by the following letter addressed by a correspondent to the Government Analyst and Inspector of Explosives (Mr. W. A. Hargreaves, M.A., B.Sc.) :—"I have recently been experimenting with gelignite to try to open up stiff subsoil, but do not seem to get the result I should. I put the cartridge in about 3ft., and the explosion caused a fair shake without much disturbance of surface soil. If the hole is filled with water it takes a long time to soak away, showing very clearly that the opening up of the soil has not been very great. The size of the cartridge used was 8in. by 1in. In this week's issue of the *Weekly Times* is a small paragraph on the subject, but the explosive used is called 'cheddite.' This is stated to have been put 3ft. in the ground, with the result that the soil was disturbed to a depth of 6ft. I find that gelignite does not disturb the ground below the depth of the hole. Could you enlighten me in any way so as to get better results."

Mr. Hargreaves' reply was as follows :—"I have received your letter of April 8th, referring to the question of breaking up subsoil with explosives. My experience has been so far that explosives will economically break up hardpan when the condition of the subsoil is hard and dry, but when it consists of stiff clay the effect is merely to compress the clay into a basin or cavity, and any cracks which may be formed do not extend very far. The time to use the explosives is when the subsoil is dry and brittle, as it usually is at the end of the summer and just before the winter rains. This year, on account of the heavy showers we have had, the subsoil is in a more or less plastic condition, and the advantage gained does not appear to justify the cost of the explosives. I have had experience with cheddite in ordinary blasting work in rock, but I have not seen it used in subsoil. In some soils it might

possibly do better than gelignite. I am forwarding your letter and a copy of this reply to the Director of Agriculture. The experience of other users of explosives for subsoiling may be available."

A SOUTH AFRICAN EXPERIMENT.

The June, 1912, number of *The Agricultural Journal of the Union of South Africa* contains a report on an experiment in the use of explosives in agriculture which should prove of interest. The experiment was carried out by Mr. Wingate-Wright, of Johannesburg, on Mr. Russell's farm at Birchleigh, a wayside station close to Zuurfontein.

The report reads :—" The conditions here were sufficiently typical of the high veld to give a very fair idea of the possible value of this particular method to farmers in similar circumstances. The soil is a deep loam, and when the experiments were carried out was in a suitable condition to show sound results. That is to say, the spot selected was dry, and the subsoil seemed well compacted. The method adopted by Mr. Wright was to bore holes a little more than half an inch in diameter to depths varying from about 3ft. 6in. to about 5ft. 6in. In each hole he lowered one cartridge, weighing about 2ozs. of ordinary gelignite, the blasting compound used for rock-breaking in the mines. Prior to lowering, the usual detonator was, of course, attached to the cartridge in the ordinary way, and the necessary length of fuse to allow of same being lighted to explode the charge. The hole was then tamped with damp earth, and the fuse lighted. The effect of the explosion in the deeper holes was not much marked on the surface, and the ground being so hard, it was difficult to dig down to the lower depths to see what had happened below. But the effects of the charges in the shallower holes, say from 3ft. 6in. to 4ft., was more satisfactory, as not only could the result be noticed on the surface, but the action of the explosive was such that the ground was easily removed with a spade, and cracks and fissures could be traced in some instances as far as 6ft. to 7ft. from the centre of the explosion. On removing the top soil the effect on the subsoil was most marked and highly satisfactory, fully demonstrating the utility of explosives for soils of this nature. It is more than doubtful if it would have been possible to get a plough into this particular piece of ground in the condition it then presented, so that here at least was the beginnings of the solution of one of this country's serious cultural problems.

" The work done by Mr. Wright must be taken as of an entirely experimental character, for though an expert in the handling of explosives for other purposes, he is, we believe, more or less of an amateur in conducting agricultural operations by its means. In addition to this, it has to be remembered that he was further handicapped, in that he had to fix up all the implements for his purpose. His method of sinking the holes, for instance, was to use an auger, which he had to have specially made. Though this

was effective, as the results of later demonstrations we had the pleasure of seeing how that the work of sinking the holes for the charges can be done better and with more expedition by other means. The explosive he applied is also quite different to that which has been brought into use for this purpose. Therefore, considering all the circumstances, Mr. Wright's experiments may be taken as even more successful than they appeared, and it is hoped that may lead to encouraging others to follow them up on a field scale. We understand that Mr. Russell intends giving the system a fair trial at no distant date. That he and others similarly situated should be encouraged to carry on this work is amply shown by the results which have been obtained not only in America, where these practices are quite common, but in the districts of the Western Province of the Cape.

"The result of a personal attendance at some demonstrations, has impressed us deeply with the conviction that this method of subsoiling should prove of incalculable value to many parts of South Africa. But to assure success, the work must be carefully and properly handled, and 'rule of thumb' will have to be carefully avoided. In other words, everything must be adjusted to the local conditions of soil and climate, and from the first nothing but the correct implements and the correct explosive used. The fact has been noted that Mr. Wright used gelignite, a highly powerful compound. That gentleman, of course, used that article because it was the easiest obtainable for his experiments. Now, the make of explosive used for these purposes in America is what has come to be known as agricultural dynamite, a blasting compound which acts in a different manner to gelignite. As the latter is made specially for blasting rock, its explosive velocity is very high. Its action in soil is accordingly rather different to that of the specially compounded agricultural dynamite, which is specially made to use in soil instead of rock. In other words, the agricultural blasting compound explodes slower than the rock-blasting compound. Therefore, anyone who is desirous of going in for this system should see that the right explosive is obtained.

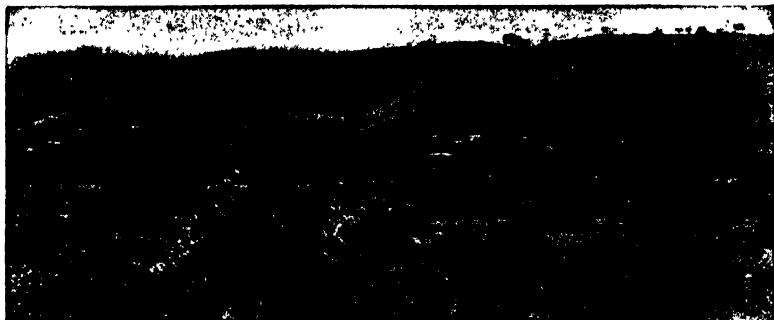
"The necessity of paying careful attention to this detail was fully apparent at demonstrations we had the pleasure of witnessing at the Government Viticultural Station at Paarl, and on Sir Thomas Smartt's farm at Stellenbosch. Though the ground at each of these places was not in such a favourable condition for blasting as was that at Birchleigh, the results from the point of view of the agriculturist were more satisfactory. The explosions in most cases (except in the holes where specially heavy charges were used to show what could be done, if so desired, for deep trenching purposes) were only just noticeable at the surface, the actual soil displacement being scarcely as great as that of an ordinary mole-hill. But when the soil was opened up it was found to be fissured and shaken in all directions, and in those cases where holes were sunk to demonstrate its uses for tree or vine planting, there was a regular pothole below, sufficient to satisfy the most exacting. Again,

when the holes were left undisturbed, columns of smoke were noticed to gradually rise out of the ground through the cracks and fissures, demonstrating the extent of the underground shock. And all this occurred, though one could almost stand over the hole while the explosion occurred. Of course, no one did so, but that was the impression the operation left on all who were present. At the same time, the shock below ground was distinctly felt for some distance. This seems to be the cardinal difference between using gelignite, a high velocity explosive, and this specially prepared agricultural dynamite, or low velocity explosive. In this case the ground was very wet and elastic from recent rains, so it was only fair to assume that had the ground been dry the results would have been even more satisfactory so far as the subsoil disturbance was concerned, for explosives act with better effect in dry ground.

"The real considerations for the practical agriculturist are, however, not so much the details given above, as the further consideration of how the system there outlined is likely to affect him in his industrial operations. All that can be said at this stage is, it looks very promising. The actual benefits can only be shown by trial and experiment. This much further can be said, however, that in certain well-recognised and well-known conditions in this country, the use of this method of subsoiling can only result in certain advantage. In heavy, stiff, compacted clays, it is bound to act beneficially, provided the soils are deep. In those cases where continuous ploughing has left what is known as a 'hard pan,' it is impossible to conceive of a better or easier method of restoring soil fertility by breaking up the lower strata and thus rendering available the latent stores of plant food. For the establishment of orchards or vineyards, where heavy and expensive trenching work is now necessary, hand spading being the only means available, this system should prove both cheap and effective. In fact, in a dozen different ways there should be both advantage and profit in its use. But there are conditions in which its use might, conceivably, be attended with results far from beneficial. And there are other conditions where no beneficial results might follow, though no actual harm would be done. It has always to be remembered that certain classes of soil may not be benefited by the disruption of the lower strata, while other again would be greatly improved. In short, this system needs to be most carefully experimented with, except in those cases where the conditions point distinctly to the possibility of improvement. To give two probable cases in point. Some of the Karoo silts in the river valleys of the Cape Province set so hard that the crying need of subsoiling has been felt for years. In such a case this system should work well. There are others of these same silts so loose and friable that it is doubtful if any advantage would be gained, if positive harm did not follow. It must never be forgotten that it is possible to over-drain certain types of soils, just as it is possible to have others too closely impacted. And that is just the one point

to be guarded against in this system, for in loose, light, well-drained soils with, say, a gravel or boulder drift bed, there is always the chance of this occurring.

"If all that is claimed for this method of opening up soils proves to be correct—and on the face of things there seems little reason to cast doubt upon the statements put forward—there is a great future for the system in South Africa. The majority of the practical men who have seen the demonstrations have been convinced that there is a great deal in it, and many have already started trials on a fairly large scale. It is to be hoped that others will follow suit, and not only carry out the work, but keep careful records and let the country know exactly what the results may be when the crops come in. There are many sets of conditions where much could be done, notably in some of the older established lucerne lands, that would bring comparative results in a fairly short time, and we hope to see a set of experiments set afoot as soon as possible with that object in view. Another set of experiments that should be promising would be the treatment of 'brak' soils by this method. Given a sufficiency of water, and this method of subsoiling, and it would be a very obstinate case of 'brak' that would not be improved. This, of course, opens up the allied question of sour or acid soils. But that is too large an issue to be discussed lightly, as it involves other important considerations. No possible harm could, however, accrue from a few carefully arranged experiments, for on their successful result great industrial and even social problems might hinge. Much of the best districts of this country, so far as rainfall is concerned, are more or less 'sour,' especially near the coast, and if the opening up of the subsoils offered any prospect of palliation, it might pay to bring more of these sections under cultivation, even though they had to be heavily limed to complete the cure. In any case, the use of this particular class of dynamite for agricultural purposes has, we feel, come to stay in South Africa, and it would be as well for all interested in increasing production and restoring soil fertility to watch with care the result of the experimental work now being carried on."



ADVISORY BOARD.

The monthly meeting of the Advisory Board was held on Wednesday, April 9th, there being present Mr. A. M. Dawkins (Chairman), Col. Rowell, Messrs. C. J. Valentine, C. J. Tuckwell, J. Miller, G. F. Cleland, G. Jeffrey, F. Coleman, G. R. Laffer, C. E. Birks, and G. G. Nicholls (Secretary).

WATER FOR STOCK.

In respect of a communication from the Orroroo Branch, which had been brought under the notice of the Railways Commissioner, relative to the provision of water for stock at certain railway stations, the Commissioner replied as follows :—" At most of our sheep and cattle loading stations there are already water supplies wherever this is at all possible. Special inquiries will be made in regard to Orroroo, and the arrangement asked for will be made."

VETERINARY LECTURER.

The Secretary reported that the Director had advised the Minister that the appointment of another veterinary lecturer would in his opinion be warranted. The Minister had referred the matter for consideration with the Estimates for next financial year.

WEIGHING WHEAT BY THE LOAD.

In reply to an inquiry sent to the Director of Agriculture in Victoria (Dr. Cameron) for information concerning the methods of weighing wheat in that State, a letter was read by the Secretary as follows :—" Wheat is being sold by the load over weighbridges in most of the older settled parts, and by the bag over scales in all the newer districts. The weighbridges used are erected by the various municipal councils, and are nearly always let by tender to suitable applicants. Where the bridges are kept in proper order and attended to by qualified and disinterested persons, and the wagons are properly tared, the system is in every respect quite satisfactory. As in other matters abuses occasionally creep in, such as letting the bridges to persons interested in wheat-buying, or to careless individuals who may allow incompetent parties to attend to the weighing, and the scales not being looked to often enough ; but, as a proof of its general acceptance, I may say that where weighbridges are erected only an occasional load of wheat is put over the small scale, as the former method is more expeditious, and necessitates only one turn of the scale instead of many as in the case of the single bag system. In districts not supplied with bridges, of course, the small scale is used. In some instances where the grain is purchased in fairly large quantities it is consigned to the

Melbourne merchants, and prior to being shipped is passed over the railway bridges a truck at a time, and is paid for by the weights so obtained. The single bag scales are always manipulated by the buyers, who, being interested parties, are not so acceptable as the disinterested attendants at the weigh-bridges." The Secretary was directed to collect and collate all available information on the wheat-weighing question, and to present it at the Congress in Adelaide in September next.

BUTTER EXPERIMENTS.

The Secretary tabled a report from the Dairy Expert (Mr. P. H. Suter) with reference to some butter experiments which had been suggested by Mr. Tuckwell. The document stated "Numerous experiments have clearly proved that where butter is manufactured under proper methods the heavier the salting the lower the water content, and the greater the loss in weighing during transit. It is a well-recognised fact that where two butters are made up from identical cream, that known as fresh or unsalted has always the greater water content. In the course of some recent experiments highly-salted butter gave on analysis 12.45 per cent. of water content, while lightly-salted revealed 12.75 per cent. The former, therefore, showed 0.30 per cent. less moisture, and was accompanied by a greater loss of 1oz. per case of butter in transit to London. Salt has various influences on butter, depending upon the condition of the butter, the flavor and the texture desired. It intensifies the color and creates a freer condition of the water content. Light salting may be said to be from 2 per cent. to 3 per cent., and heavy salting from 4 per cent. to 6 per cent. The most satisfactory quantity to use for the English market may be set down at from 3½lbs. to 3¾lbs. per 100lbs. of butter. I am of opinion that some defects in condition and flavor of butters may be traced to the use of inferior salt and preservative, and I feel it would be of value to our butter manufacturers if the department would cause a complete analysis of the salt used at the factories to be made. Generally speaking, the manufacturers do not pay sufficient attention to the importance of using only the best and well-proved brands, and there is a tendency to purchase the cheapest kinds. Salts are of varying composition. The moisture content may, on analysis show from 1 per cent. to 1.5 per cent., and in some makes contain too high a percentage of sodium sulphate or calcium sulphate. Such impurities may have an injurious effect upon the flavor and quality of the produce, whether it be butter or cheese. From numerous experiments which I have conducted I have proved that salt has had the effect indicated. I have had some tests down now for more than seven weeks at the Government Factory with a view to ascertain the effect of varying quantities of preservatives and salt upon the water content, the keeping qualities, and the general condition of the produce. Further experiments are in hand, mainly to prove what are the principal factors conducive to high and low water content in

butters. I consider that some microscopic work of much value to our factories might be conducted, especially in connection with the water and salts used." It was decided that Mr. Tuckwell should have a chat with the Director regarding the possibility of having the necessary work done at the Government laboratory.

TWENTY-FIFTH ANNIVERSARY.

The Secretary announced that Thursday would mark the twenty-fifth anniversary of the first meeting of the Agricultural Bureau, and he thought consideration might well be given to the question of celebrating the auspicious occasion in some fitting manner. He added that the first meeting was held on April 10th, 1888. During that year 10 Branches were formed, and of those nine were still in existence. Seven of the nine had an unbroken record, while the other two had gone into recess for a couple of years. The 10 referred to were Angaston, Burra, Mannum, Stansbury, Millicent, Gumeracha, Kanmantoo, Gladstone, Davenport, and Mount Gambier. Branches were inaugurated at Port Germein and Naracoorte in April, 1889, and were therefore in their twenty-fifth year. The first four Branches—Angaston, Burra, Mannum, and Stansbury (closed in 1909)—were established on May 24th, 1888. Of the original members of the three existing Branches among that group apparently only two men were still connected with the Bureau. He referred to Mr. Johann Gottlieb Preiss, of Mannum, and Mr. J. H. Rogers, of Burra. Neither of those gentlemen had been elected a life member of the Bureau. The only member of the original Central Bureau at present in South Australia was Professor Lowrie. Mr. Valentine was appointed a member during the first 12 months, and his service had been continuous ever since. There were still many active members of the earliest branches formed in 1888 and 1889. Fifteen months after the initial meeting of the Central Bureau there were 18 branches, with a total membership of 135. Now there were 147 Branches, comprising 3,244 members. He thought it would be a good plan to celebrate the anniversary on the occasion of the Farmers' Congress in September, and suggested that the opening night should take the form of a banquet or dinner in the Brookman Hall at the School of Mines. The usual speakers—the Governor, the Minister of Agriculture, the Chairman of the Advisory Board, and others—could occupy their accustomed places, and could submit toasts in lieu of the ordinary addresses. An opportunity would thus be given the farmers to show their appreciation of Sir Day Bosanquet, who had well earned the title of "The Producers' Governor," prior to his departure from the State. The idea ought to appeal to the delegates chosen to represent the various branches. A first-class dinner could be provided for 3s. 6d. a head, and a special souvenir programme could be prepared. Invitations might be sent to the relatives of the late Mr. Albert Molineux (Secretary of the organisation for many years), and advantage could be taken of the occasion to present the certificates to the men who had

been appointed life members. The Minister was quite in accord with the suggestions put forward. Several members supported the idea, and it was decided to act on the suggestions made by the Secretary.

FARMERS' CONGRESS.

Professors Lowrie and Perkins, the Chairman, and the Secretary were chosen a committee to make arrangements for the programme to be presented at the Farmers' Congress. Mr. Coleman thought there should be a few outstanding features and plenty of time for full discussion, rather than a large number of addresses and only limited time for discussion.

DOG NUISANCE.

Mr. Birks said at the recent meeting of the Crytal Brook Branch there was an animated debate on the dog nuisance among sheep. Eventually, the members had carried a resolution requesting the Advisory Board to consider the question, and suggesting that the various branches interested should be invited to go into it with a view to its full ventilation at the Congress. The Secretary was instructed to bring the matter before the Congress Committee.

LIFE MEMBERSHIP.

Mr. G. Hicks, a valued member of the Cherry Gardens Branch since March, 1893, was elected a life member of the Agricultural Bureau.

A NEW BRANCH.

Approval was given to the formation of a Branch at Borrika, on the Brown's Well railway, with the following gentlemen as members, viz.: Messrs. E. H. Huxtable, L. G. Huxtable, R. N. Collins, H. Collins, J. Waters, J. Waters, C. Springett, A. Springett, J. Woods, L. Sandercock, W. Mayfield, T. Wright, A. E. Seary, R. Lillywhite, --- Hart, --- Gray, G. Stevens, --- Mansfield, G. Back, C. Trenorden, G. Bowden, V. V. Brown, G. L. Bonython, J. B. Tonkin, R. J. Stephens, H. J. Stephens, H. Weber, J. E. Coombs, --- Green, C. W. B. Traeger.

NEW MEMBERS.

Wirrabara—J. Fitzgerald, L. G. Dansie, S. Brown; Warcowie—B. Crossman; Hooper—J. Carlyle, W. I. Sweetman, W. H. Boyce, E. P. Lee; Pine Forest—H. Adams; Mount Remarkable—G. Casley, J. Welsh, F. B. Smith; Hartley—J. Hudd, jun., S. Beavis; Meningie—H. N. Mincham, G. Hastings; Narrung—G. T. A. Brodie, R. Bennetts, G. J. Scott; Utera Plains—H. Barber; Port Elliot—J. Gordon, Rev. A. W. Gordon; Crystal Brook—R. J. Dennis, A. J. Dennis, T. H. Wilkinson, C. J. Jenner; Minlaton—J. A. O'Brien, R. H. Tilbrook; Tintinara—J. Henderson; Port Pirie—S. Brine, T. G. Kirchner; MacGillivray—D. Lade; Berri—C. Virgo, S. B. Day, W. P. Penyfield; Morgan—J. B. Hoffmann; Belalie North—W. T. Hall, H. Steer, S. Gullidge; Hookina—P. Hentschke, P. Kelly, jun.

SHEEP ON THE FARM.

By HENSHAW JACKSON, Wool Expert, S.A. School of Mines and Industries

(Continued from page 853.)

The average farmer probably thinks that the full effect of a combination of sheep and wheat will be attained provided he purchases a flock of any and all sorts at the local sale yards, takes them home, and turns them out on his fallow or stubble with his blessing, to come in, he hopes, at shearing time with a full fleece and a fat lamb at foot. If, as is often, not surprisingly the case, he is disappointed in wool return and lambs fit for market, he is quite satisfied that sheep do not pay, and possibly voices that opinion at meetings of the Agricultural Bureau. Cases like the imaginary one cited above are fairly common and are likely to increase until the farmer who decides to run sheep upon his farm learns to regard the animals as being of just as much importance in relation to his general operations as seeding and fallowing. The man who gets sheep into the right perspective on the farm is the one who is going to succeed in making money-spinners of them in every direction where the sheep can be utilised as such.

In Australia we have become accustomed to regard the sheep as an animal that thrives mainly upon large areas of open country and is incapable of giving good returns when any restriction is placed upon its roving propensities. This may be to some extent true of the Merino, though, even in his case such ideas may be considerably modified. The farmer's sheep however, need not be Merinos, albeit in France the Merino "Rambouillet" strain is the farm sheep par excellence. What appears to be necessary is for our farmers to regard themselves, where sheep are concerned, as being in a different line of business to that of the large pastoralist and sheepbreeder, working to a different purpose and employing methods quite dissimilar. The pastoralists' first and last aim is wool; fat sheep and lambs are side issues depending entirely upon the bounteousness of nature, cheerfully accepted when they come, but not counting as important factors in the difference between profit and loss in the industry.

Wool alone pays handsome dividends to the pastoralist, in spite of droughts. His areas are large, rents fairly reasonable, and flocks extensive enough for him to depend upon wool as the principal source of revenue. With the farmer conditions are entirely different, save for dry times, but which he can provide against more easily than the pastoralist. Farming land is very much

higher in value and a great deal smaller in area, so that to run sheep on a farm for wool only would prove disappointing. Wool grown on the farm cannot compare with that grown on large stations in the back country for a variety of reasons, such as the sheep being generally mixed as to breed and age, and running a good deal on fallow, allowing the fleece to become both dirty and heavy, and lack of knowledge in the preparation of the wool for market. At the same time these reasons do not constitute an argument in favor of sheepless farms; they only point to the need for a different and clearer view of sheep in relation to farms and farming.

On an agricultural holding every acre is cultivated with the view of producing a crop of grain or hay, consequently the natural pasture is torn up and dissipated; any sheep on the place are thereby deprived of their natural means of subsistence, save what springs up on the fallows; other stock, horses and cattle, receive their proper share of the feed produced, being considered entitled to it as workers or producers; seldom does anyone think that sheep need be fed. Now, this is not a fair thing, although it is a common occurrence, and to my mind is the reason why sheep on the farm are not the success that they should be, and for which they are the best fitted beastie on four legs to-day.

When the farmer begins to realise that the sheep has an appetite the same as a cow, and an aptitude for laying on flesh on little food that no cow ever had, together with the capacity of growing a fleece of wool, and producing lambs that will be saleable in weeks where calves take months, and die when it will, never dies in debt, then will the sheep on the farm come into its own and take the high place in agriculture that it deserves.

Comparisons are proverbially odious, and one gets rather tired of citing statistics; but when writing on the question of farm sheep in Australia one is constrained to mention the fact that in the United Kingdom of Great Britain, and the comparatively small area contained therein, there are 27,000,000 of sheep running under conditions which, generally speaking, cannot be considered as favorable as those existing in South Australia. In Great Britain the farmer regards the sheep as a prime factor; with us he is largely a circumstance which may or may not exist. In the future it is to be hoped that he will exist in greater numbers and under better conditions than he does to-day on the small holdings of the State, and in following articles I will endeavor to show why such should be the case.

(To be continued.)

POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

OPERATIONS FOR MAY.

COLD WEATHER CONDITIONS.

The weather conditions during the ensuing four months will be quite different from those which have obtained since last September. A period of low temperatures, rain, and conditions which are generally against egg production will be experienced. Under modern conditions of poultry culture, however, it is possible to do many things which shall keep the hens in a condition to lay well. There are always breeders who are in the happy position of being able to market ample supplies of eggs when scarcity exists and market rates are high. Owing to the personal equation this condition of affairs is likely always to persist. There are many who will not take the trouble to do things as they should, and there are others who have the unfortunate gift of always doing things wrongly. On the farm, as a rule, the fowls are allowed to "exist," and are, in many cases, not housed properly nor fed. And in too many cases the fowls are not of the right kind to lay eggs, except in the spring months when eggs are cheap. In many suburban back yards, where so many thousands of fowls, &c., are to be found, the conditions often reveal little improvement on those existing on many farms. The so-called houses are wretched structures, the birds are neglected, ill-fed nondescripts, and the sanitary conditions a menace to health. However, on many farms there are good poultry houses, and there are large sheds where the birds congregate and are comfortable under adverse weather conditions. The birds are, at any rate, given a sufficiency of food even if its feeding value does not answer all that it should. In many suburban back yards one finds pleasing conditions well housed, well fed, and healthy fowls. There are three essentials for successful poultry culture at all times, and during the cold weather there is pressing need for their due observance.

Some readers may say that the following remarks are like "a tale oft told," but it must be pointed out that one must repeat, must persist, and hammer away until due and universal recognition is given by all breeders to the salient points of this important business.

Housing.— During the cold wet period of the year the importance of adequate housing is more than ever to be insisted upon. Upon good housing depends

the health of the birds, and consequently the production of eggs. Not only must the birds be adequately sheltered from wind and rain, but they must be afforded ample and sufficient ventilation in order to keep them in health. A "warm" house in wet weather may be a death trap, because the conditions are insanitary and there is lack of ventilation. Houses must be so constructed that while free from draughts and quite dry they also provide plenty of air space per bird. Poultry, like all other birds, require plenty of oxygen. They become debilitated and an easy prey to all sorts of disease organisms if their vitality is lowered through breathing vitiated and poisonous atmospheres. They must be so well surrounded by pure fresh air that all body exhalations may pass away freely, for it is an ascertained fact that slow poisoning results when these conditions are not observed. We know that in the healthy organism the power of resisting the inroads of disease is in a high state, while in the debilitated bird the reverse condition exists. The average poultry house is either draughty or is ill ventilated. Draughts are bad for all stock, plant life, &c., because in a draught there is a state of unbalanced conditions. Fresh air and ventilation can be provided without the occurrence of draughts. Do not build low-roofed poultry-houses - the floor space available for each fowl depends largely upon the air space provided. In some of the little ramshackle huts so often seen there is not air space enough for a quarter of the poultry usually accommodated. Build your poultry-houses sufficiently high to allow of enough air content for your birds. Before you can properly control your ventilation arrangements you should enter the poultry-houses at night and ascertain then if the air is fresh and sweet, or whether it is foul-smelling and moisture-laden. The air inhaled by a fowl only contains, in this climate, a small percentage of moisture, except in special circumstances. The air expired from the lungs of bird or beast is loaded with moisture to saturation point. This is why sickness occurs in many cases where fowls are so housed that the atmosphere in the house is damp.

Ventilation must be provided so that a direct current of air does not strike the birds - it should be directed to the roof (the ceiling, one may say) and then radiated or dispersed over the whole inside space.

Scratching-shed houses are the best for winter egg production and for the small holder and back yarder at all times. At some future time I may issue an illustrated bulletin covering the subject of housing. In general, a house 20ft. long and 17ft. to 20ft. wide, 8ft. to 9ft. high in front, and 6ft. high at the back will accommodate 80 to 100 laying hens. The house may be divided so as to run two lots instead of one flock. The posts should be of sawn gum or jarrah, the rails of oregon, the roof, sides, back, and the wind screen in front should be of galvanised corrugated iron. The perches are situated along the rear wall and should all be upon one level. The nests may be made along the front so that the eggs may be gathered easily, and the water vessels

may be in front also. It will always be necessary to enter the houses to collect the eggs which some perverse hens will not lay in the nests. The floor of these houses should be raised above ordinary ground level at least 6 in. and concreted. Upon the concrete lay 6 in. of sandy soil, and then above this keep a good supply of straw for scratching litter. Birds so housed will be healthy and productive, and the owner can attend to them in the worst weather without suffering discomfort. Make this great step towards success and adopt proper methods of housing.

Feeding.—Too much consideration cannot be given to this important subject. Fowls which roost in trees and other exposed conditions will, if well fed, grow and keep healthy. But poultry under any conditions must be well fed if they are to grow, thrive, and keep in health. Many people are very peculiar in their ideas of adequate feeding. Some are inordinately mean and either starve their birds or else feed them on so-called cheap rubbish devoid of nutriment. Some few overdo the business and overfeed their birds until the inevitable happens. Birds kept in scratching-shed houses, or in ordinary houses with attached yards, well supplied with scratching material, are easily fed if proper foods are supplied. Feed all grain in the scratching litter, but all mash must be fed in pans if wet, and in proper hoppers if the dry mash system of feeding be adopted. Keep small troughs or other receptacles well supplied with hard quartz and shell grit and small pieces of charcoal. Cut green food must be supplied daily as it is of the utmost importance; it supplies the invaluable mineral salts and other essentials. Where the dry mash system is adopted the labor of feeding is reduced to a minimum. Hoppers to contain the mash may be made large enough to hold a week's supply. In this method no wet mash is used. The dry mash is available at all times, or it may be shut off except for an hour or so in the morning. It is usual to feed the cut green food mixed with the wet mash and again separately in the middle of the day. Where dry mash is used the birds may have two lots of cut green food—one at 8 a.m. and the other at 12 noon to 2 p.m.

Wet mash differs mainly from dry mash in being moistened with milk, water, or soup to a crumbly mass. Dry mash may have some few additions and may include a proportion of grain. The theory of feeding dry mash is that its use forces a fowl to eat slowly, as before it is able to swallow it must mix each mouthful of dry mash with saliva. Saliva contains the diastase, *ptyalin*, which performs the first act of digestion—the attack upon the stomach content of the fowl.

Mash is generally composed of one part bran and two parts pollard (by bulk). To this may be added a part of cut green food. The whole may then be moistened to a crumbly mass with water, soup, or milk. The best method is to scald the bran and allow it to stand. Then dry off the bran with the pollard and cut green food. If soup is used it may be made from any fresh,

untainted meat. Meat meal should be used sparingly and at the rate of from $\frac{3}{4}$ lb. to $1\frac{1}{2}$ lbs. per hundred birds thrice a week. Mash can, of course, be made by grinding a mixture of various cereals, &c., in proper proportions.

The grain fed in the litter may consist mainly of sound wheat. During cold weather peas and oats may be freely used, and also a little barley (malting or English) and maize. There is no hard and fast rule as to quantity. Generally speaking the birds may have as much wet mash as they will eat in 10 to 15 minutes. You must handle your birds and take the egg yield into consideration. If eggs are abundant continue your methods. If fowls are thin and there are few eggs give more food. If hens are fat and heavy and eggs are scarce diminish the food, especially those parts which tend to fat production.

Breed and Strain.—I have deferred mention of this point until the last, yet it is of great importance—yet more generally recognised than is the case with housing and feeding. Whatever the class of stock you may possess you will expect a reasonable number of eggs, and the remarks above apply to all breeds. Where egg production alone is the main object in view, then you must have pullets and selected hens of proved laying strains only. You may have the best layers obtainable, but you will get few eggs unless they are adequately housed and fed. This was conclusively proved in the Kybybolite tests.

NOTES.

Breeders are reminded that it is enjoined upon them by law to notify outbreaks of the following diseases:—Roup or diphtheria, cholera, chicken-pox, favus, and also if their premises are infested with poultry ticks.

Lose no time in forking over the ground in all poultry yards. Where the scratching-shed system of closed houses is adopted you can, after digging the yard, give them a heavy dressing of quicklime, and later on lightly fork it in and plant a good soil-sweetening fodder crop. Those who found it too hot to build poultry houses in summer may take note that the weather is cool now and the time appropriate for all sorts of activities.

Do not forget to lay in a supply of gravel, grit, sand, straw, &c.

Eggs are now moving upwards in price. Are your hens laying and are you gathering in the dollars? If not, carefully re-read all these notes and take prompt action.



EGG-LAYING COMPETITION.

TWELVE MONTHS' TEST.

PARAFIELD POULTRY STATION.

[Started April 1st, 1913, to terminate March 31st, 1914.]

Competitor.	Eggs Laid for Month ended April 30th.	Total Eggs Laid from April 1st, 1913, to April 30th, 1913.
SECTION I.—LIGHT BREEDS.		
WHITE LEGHORNS.		
Hurford, E. W., Grangeville	40	
Hamill, H., Kogarah, New South Wales	31	
Carter, A. A., Keswick	30	
Robins, G. W., Hawthorn, Victoria	55	
Dunn, L. F., Keswick	22	
McKenzie, H., Northcote, Victoria	39	
Cowan Bros., Burwood, New South Wales	33	
Robbins, G. W., Hawthorn, Victoria	21	
Pettigrove, T. A., Northcote, Victoria	16	
Eckermann, W. P., Eudunda	6	
Robertson, F., New Hindmarsh	15	
Pettigrove, T. A., Northcote, Victoria	19	
Cant, E. V., Medindie	20	
Schäfer, N. H., Strathalbyn	75	
Redfern Poultry Farm, Caulfield, Victoria	57	
Chapman, G. H., Port Pirie	49	
Lewis, F. M., Caulfield, Victoria	65	
Redfern Poultry Farm, Caulfield, Victoria	52	
Hagel, W. C., Mallala	19	
Hocking, E. D., Kadina	11	
Sargenfri Poultry Yards, East Payneham	53	
Joass, W. A., Rothbury, New South Wales	21	
Bennett & Furze, Wright Street, Adelaide	43	
Jury, W. H., Torrensville	33	
Olive Poultry Farm, Freeling	43	
Kelly, Mrs. W. J. L., Quorn	14	
Indra Poultry Farm, Freeling	57	
Electricum Poultry Yards, Glenelg	58	
Sargenfri Poultry Yards, East Payneham	56	
Moritz Bros., Kalangadoo	49	
Brown, S., Gembrook South, Victoria	49	
Matthews, H. G., Fullerton	14	
Harris, J. G., Black Forest	47	
Tockington Park Poultry Farm, Grange	23	
Bradley, J. E., Newport, Victoria	60	
Miller, B., Parkside		
McKenzie, E., Northcote, Victoria	73	
Tockington Park Poultry Farm, Grange	57	
Provis, W., & Son, Tumby Bay	27	
Billroest Poultry Farm, Brighton, Victoria	67	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Mon h ended April 30th.	Total Eggs Laid from April 1st, 1913, to April 30th, 1913.
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SECTION I.—LIGHT BREEDS—*Continued.*WHITE LEGHORN—*Continued.*

Beadnall Bros., Gawler	34
Morgan & Watson, Frankston, Victoria	48
Kerr, R., Longwood	1
Gibbs & Pine, Queenstown	14
Hills'ide Poultry Yards, Hamley Bridge	35
Hall, A. W., South Oakleigh, Victoria	72
Dreyer, G. H., Wolfram Street, Broken Hill	11
South Yan Yean Poultry Farm, Doreen, Victoria	10
Pope, R. W., Heidelberg, Victoria	71
Tabuteau, J. O., Black Rock, Melbourne	39
"Koonoowarra," Enfield	30
Hagger, J. C., Ororoo	21
Bertelsmeier, C. B., Clare	38
South Yan Yean Poultry Farm, Doreen, Victoria	33
Jelliff, Mrs. T., Beverley, Adelaide	21
Hughes, J. J., Elsternwick, Victoria	37
Stewart, J. R., Thirlmere, New South Wales	5
Aveling, T. B., Quorn	—
"Nunkeroi," Neales Flat	3
Prior, D., Moonta Mines	46
Leonard, W. J., Port Pirie	61
Barkla, L. W., Gawler South	40
Foreman, E., Hindmarsh	42
Broderick Bros., Gawler	21
Tubb, E. C., Frewville	15
Harfield, B. L., Pinnaroo	33
Foreman, E., Hindmarsh	4
Tomlinson, W., Westbourne Park	67
Woodhead, H., Torrensville	61
Padman, A. H., Hyde Park	79
Franklin, G., Norwood	42
Mathias & Weller, Unley	1
Messenger, A., Port Adelaide	20
Purvis, W., Glanville	53
St. Bernard Poultry Farm, Magill	77
Dunstan, L. A., Port Pirie	42
Trenwith, T. H., Kadina	44
Purvis, W., Glanville	60
Rice, J. E., Cottonville	59
Evans, H. A., Richmond	32
Miels, C. & H., Littlehampton	60
Swift, W. G., Northcote, Victoria	61
Bertelsmeier, C. B., Clare	50
Brundrett, S., Moonee Ponds	27
Glenelg River Poultry Farm, Mount Gambier	54
Padman, A. H., Hyde Park	33
Purvis, Miss Gracie, Glanville	49
Braund, J. E. & H. J., Islington	69
Ontario Poultry Farm, Clarendon	72
Brock, A. G., Hamley Bridge	11
Russell, E. L., Salisbury	20
Schwabl, J., Elsternwick, Victoria	55
Moritz Bros, Kalangadoo	78

EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month Ended April 30th.	Total Eggs Laid from April 1st, 1913, to April 30th, 1913.
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SECTION I.—LIGHT BREEDS—Continued.

WHITE LEGHORNS—Continued.

Craig Bros., Hackney	12
Codling, H., Mitcham Park	55
Tidswell, H. J., Clarence Park	41
Bennett, E. V., Kalangadoo	46
Lillywhite, R. G., Malvern	30
Harris, A. W., Mallala	23
Hagger, W. H., Malvern	73
Winter, W. C., (Nalpa), Strathalbyn	10
Whitegate Poultry Farm, Deepdene, Victoria	33

BROWN LEGHORN.

Toe, C. E., Brighton, Victoria	—
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BLACK MINORCA.

Whitrow, A. J., Knoxville	—
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SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Neville, A. B., Fullarton	13
Thornton, W. J., Kew, Victoria	4
Kenway, D., West Pennant Hills, New South Wales	103
Martin, B. P., Unley Park	3
Cowan Bros., Burwood, New South Wales	43
Tockington Park Poultry Farm, Grange	23
Pearson, W. S., Kingswood	38
Hall, A. W., South Oakleigh, Victoria	38
Padman, J. E., Plympton	72
Greaves, W. E., Prospect	24
Bertelsmeier, C. B., Clare	10
Coto, T. W., Myrtle Bank, Victoria	66
Convent of the Good Shepherd, Oakleigh, Victoria	12
Craig Bros., Hackney	36

BUFF ORPINGTONS.

Hocart, F. W., Clarence Park	21
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SILVER WYANDOTTES.

Dunn, L. F., Keswick	57
Western, F. C., Marion	—
Tockington Park Poultry Farm, Grange	22
Kappler Bros., Marion	15

WHITE WYANDOTTES.

Bradley, J. E., Newport, Victoria	29
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BLACK LANGSHANS.

Stevens, E. F., Littlehampton	38
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FAVEROLLES.

Williams, W. H., Frewville	—
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DORKINGS.

Cathcart, J. F., Newburg, Scotland	40
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EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month ended April 30th.	Total Eggs Laid from April 1st, 1913, to April 30th, 1913.
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SECTION III —PRODUCERS.

Limited to Entries from Farmers, Pastoralists, Fruit and Vegetable Growers.

WHITE LEGHORNS.

Broster, G., Mallala	69
Carling, R., Kangaroo Flat	79
Rowe, J., Long Plain	44
Broster, G., Mallala	74
Gilbert, F. W., Kangaroo Flat.....	17
Campbell, J. D., Barabba	27
Forest Leigh Poultry Farm, Jamestown	12
Kerr, R., Longwood	26
Carling, R., Mrs., Kangaroo Flat.....	68
Rowe, J., Long Plains	18
Gill, R., Marrabel	15
Wurst, G. H., Marrabel.....	3
Sherrah, E., Long Plain	32
Rowe, N., Long Plain	36
Shepherd, R. H., Balaklava.....	19
Lacey, F. C., Kybybolite	64
Bertelsmeier, O. O., Booborowie	49
Dunn, H. J., Black Springs.....	18
Drake, C., Naracoorte	15
Rackham, C. Naracoorte	69
Holmes, F. A., Naracoorte	52
Hutchison, W. J. S., Naracoorte	—
"Herdsfield," Mount Gambier.....	83
Smith, R. L., Hynam.....	5
Gill, Mrs. J., Kapunda	—
Sampson, C., Koorunga, Burra	48

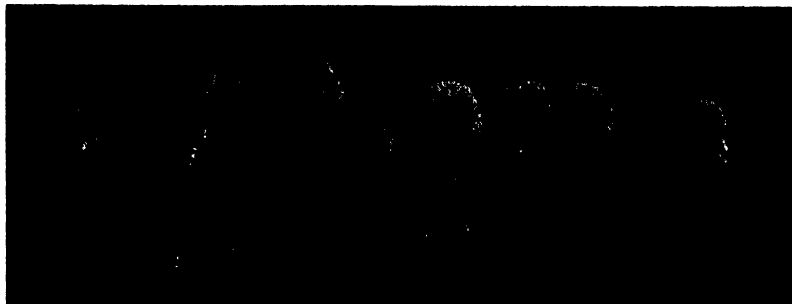
BLACK ORPINGTONS.

Dunn, H. J., Black Springs	—
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BLACK LANGSHANS.

Stevens, E. F., Littlehampton	31
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D. F. LAURIE, Poultry Expert.



MONTHLY REPORT OF EGG-LAYING COMPETITION.

HELD AT THE PARAFIELD POULTRY STATION.

The 1913-14 egg-laying competition began on April 1st, at the new Parafield Poultry Station, which is close to Salisbury, and is distant about 10 miles from Adelaide, on the main North railway line.

The entries totalled 162 pens, which is a record for South Australia. Of these, 154 pens put in an appearance, and thus this test constitutes a world's record number of fowls—924—competing in any laying competition hitherto organised.

CLASSIFICATION.

The competition is divided into three sections and the competing pens are as follows:—

Section I.—Light Breeds, viz.—White Leghorn, 101 pens; Brown Leghorn, 1 pen; Black Minorca, 1 pen—total, 103 pens.

Section II.—Heavy Breeds—Black Orpington, 14 pens; Buff Orpington, 1 pen; Silver Wyandotte, 4 pens; White Wyandotte, 1 pen; Langshan, 1 pen; Faverolles, 1 pen; Silver Dorking (from Scotland), 1 pen—total, 23 pens.

Section III.—Limited to competition among pastoralists, farmers, fruit and vegetable growers—26 pens White Leghorn, 1 pen Black Orpington, 1 pen Langshan—total, 28 pens.

THE PENS.

The competition block consist of three houses, each 504ft. long. These are divided into 9ft. sections, each separate house thus provided is 6ft. high in front, 5ft. high at back, and 5ft. 10in. wide. The houses are half closed in front with corrugated galvanized iron, the balance is wire netting. The floors are raised about 9in. above ground level and are cement concreted. Over the concrete is a layer of about 6in. of sand and loam mixed, and on this again there is a thick layer of straw for scratching material. Two perches are provided in anticipation of an increased number of competitors in the pens of future competitions. Each house will have a yard 9ft. wide by 40ft. long, surrounded to a height of 2ft. by a galvanized-iron wind screen. A sun shade will be erected in each yard.

BIRDS CLOSE HOUSED.

Until the end of spring, when settled fine weather is assured, the birds will be kept confined within their scratching-shed houses. Two factors decided me in this action. Owing to the decision to hold this test at the new poultry station there was not time to erect the yards in readiness for the start on April 1st. I had decided upon a first-class, damp and weather proof house, and that class of building requires time for erection. Secondly, the splendid results of close housing during cold wet weather, which resulted at the Kybybolite poultry station, made it clear that the system would answer at Parafield, where the weather conditions are still an unknown quantity. Again, I have for years urged the advisability of adopting the close-housing system, and have designed such a number of private plants in conformity, that it is reasonable to practice what one preaches.

THE BIRDS ON ARRIVAL.

As might naturally be expected, among such a large number of competitors, there would be some whose judgment in selecting birds might be at fault. It is encouraging to note that a number of novice breeders are making their

how to the public, and they are accorded a hearty welcome. Some no doubt have sent birds which in some cases are overripe and have been laying for a time. Others again forwarded birds which were too young and will not lay for some weeks yet. The very forward laying birds were sent by others than novices also, and as a result, the birds which led off with a splash have suffered a check.

Taken as a whole the birds are a fine lot—quite the best all-round lot that have hitherto competed here. In Section III., the Producers' Class, the quality of the birds will prove a revelation to those who expected a collection of nondescripts. It is with regret that I notice the poor entries of Wyandottes and the absence of Plymouth Rocks. It is true that in a laying competition the yield of eggs alone appeals to the public. The all-round value of the dual purpose fowl must not be forgotten.

VERMIN.

From a personal inspection of a large number, and from the reports of the inspectors, I am pleased to record the practical absence of vermin. There were but a few of the feather and scale eating kinds.

THE HEALTH OF THE BIRDS as a whole has been excellent. Five cases of chicken pox have been treated; the worst case is that of a local pen. One bird died of the trouble, which was evidently one of complications.

MOULTING was feared owing to the heat of the sun at times, and from the fact that many of the birds were in laying condition on arrival. So far there has been only one case—a pen of white Wyandottes—in which the moult is heavy, and this will mean a complete renovation of the plumage and consequent loss of time. I do not think the other cases will be more than partial moults. The fact that the birds are well and warmly housed will be a great help to them at this juncture.

BROODINESS has not been recorded during the month. During the currency of this test all Leghorns which become broody will have an extra legband attached, and on this will be shown the number of times that particular hen shows signs of the maternal instinct.

THE WEATHER is always an important factor in a laying competition. The early part of the month was characterised by cold and cloudy days, and on one morning a sharp frost occurred. Light rain fell on several occasions, and once 47 points was recorded. Except that the warm days were unwelcome, the weather problem is quite secondary where the birds are in closed houses.

THE EGG PRODUCTION is on the whole gratifying. In Section I. four pens have not yet laid, in Section II. two pens, and in Section III. three pens. The highest scores are—Section I., A. H. Padman (White Leghorns), Hyde Park, 79; Section II., D. Kenway, Pennant Hills, N.S.W., 103 (Black Orpingtons); and Section III., "Herdsfield," Mount Gambier (White Leghorns), 83.

Averages—Section I., 38.1; Section II., 30.7; Section III., 34.8.

PUBLIC VISITING DAYS.

The first Wednesday and the last Saturday in each month (between the hours of 9 a.m. and 5 p.m.) are set apart as public visiting days, and this rule will not be departed from. Trains leave Adelaide for Salisbury at 7.40, 8.0 a.m., 1.22 p.m.; and return from Salisbury at 5.9 p.m. and later.

ROSEWORTHY, KYBYOLITE, AND MURRAY BRIDGE poultry stations are closed, and all the pens, birds, &c., have been removed to Parafield.

CORRESPONDENCE.

It is specially requested that all correspondence relating to the competition or the poultry station be addressed to the Poultry Expert, Adelaide.

D. F. LAURIE, Poultry Expert and Lecturer.

THE WHEAT MARKET.

The March number of *The Bulletin of Agricultural Statistics*, published by the International Institute of Agriculture, contains the figures of the harvest of 1912-13 in the Southern Hemisphere, and later, with the help of these figures, and adding those of the harvest of 1912 in the Northern Hemisphere, the cereal production of the world in 1912 and 1912-13 is established. For the total of the 27 following countries:—Germany, Austria, Belgium, Bulgaria, Denmark, Spain, France, Great Britain and Ireland, Hungary (Kingdom), Italy, Luxemburg, Norway, Netherlands, Roumania, Russia in Europe (63 Governments), Switzerland, Canada, United States, India, Japan, Russia in Asia (10 Governments), Algeria, Egypt, Tunis, Argentine, Australia, New Zealand, the production of wheat in 1912 and 1912-13 was 7.6 per cent. greater than for the previous year. For the same countries, except India, Argentine, and Australia, that is, for 24 countries, the production of barley in 1912 and 1912-13 showed an increase of 6.3 per cent. For the same countries as for wheat, except India, Egypt, and Australia, the production of oats in 1912-13 expanded 20.5 per cent. For the following 17 countries:—Austria, Bulgaria, Spain, Hungary (Kingdom), Italy, Roumania, Russia in Europe (63 Governments), Switzerland, Canada, United States, Japan, Russia in Asia (10 Governments), Algeria, Egypt, Tunis, Argentine, New Zealand, the production of maize advanced 16.1 per cent.

Under date London, March 28th, *Beerbohm's Evening Corn Trade List* states:—“Notwithstanding liberal exports last week, the quantity afloat, owing to large arrivals, both in the United Kingdom and at Continental ports, showed a decrease. This week, also, there have been very large arrivals of Plate wheat, especially on the Continent, and in all probability there will be another decrease in the afloat figures. These large arrivals of Foreign wheat, now that native supplies are smaller, owing to farmers being busy in the fields, have come in very useful. In a short time, when spring sowings are completed, offers from farmers are expected to show some increase, and as imports will continue liberal, it remains to be seen whether the wheat will be easily absorbed or not. If the reopening of lake and river navigation in North America takes place as early as expected, exports from that part of the world will soon increase, whilst shipments from the Argentine are not likely to materially decrease for some time. The ports in the Sea of Azof are gradually reopening, and some increase, if only a moderate one, in exports from Russia must be expected. Australian shipments are likely to decrease next month, but, taken altogether, it is most probable that the weekly exports will be fully up to the estimated large requirements. In last week's *Review* it was mentioned that the total yield in Australia was believed to be 1,000,000 to 1,500,000 quarters larger than in the previous year, but, judging from the latest official estimate of the yield in New South Wales, it looks as if the Australasian wheat crop in nearly 2,000,000 quarters in excess of the previous one, in which case the surplus for export would be about 7,000,000 quarters, of which 5,500,000 quarters would be available for Europe.

“The latest reports received regarding the appearance of the autumn-sown wheat are favorable practically all over Europe, a general improvement having taken place during the past month. The course of prices in the near future, apart from the progress of the growing crops, will probably depend much on the extent of the exports from Russia during the rest of the season.”

Date.	LONDON (Previous Day).		ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
	—	Per Bushel.			
April 7	Firm, held higher; Jan.-Feb., 4/9½; Liverpool held for 3d. advance	.. ..	3/7½ to 3/8	3/8	3/7½ to 3/7¾
8	.. ..	.. ..	Do.	3/7½ to 3/8	Do.
9	Very firm, further advance asked; Liverpool firm	.. ..	Do.	Do.	3/7½ to 3/7¾
10	Firm, but quiet; Liverpool easier tendency	.. ..	Do.	Do.	Do.
11	Strong, rather dearer; Jan.-Feb., sailer, 4/9½; Mar.-April, steamer, 4/9½	.. ..	Do.	3/7½ to 3/8	3/7½ to 3/8
12	—	.. ..	Do.	Do.	Do.
14	Steady, but quiet; Liverpool firm, held at full rates	.. ..	Do.	3/8	3/8
15	Steady, quiet	.. ..	Do.	Do.	Do.
16	Quiet, easier tendency	.. ..	Do.	Do.	Do.
17	Steady, quiet	.. ..	Do.	Do.	3/7½ to 3/8
18	Do.	.. ..	Do.	Do.	3/8
19	Very firm; Liverpool firm, rather dearer	.. ..	Do.	Do.	Do.
21	—	.. ..	Do.	Do.	Do.
22	Very firm, 3d. to 6d. advance asked; Liverpool firm, with fair inquiry	.. ..	Do.	Do.	Do.
23	Strong, rather dearer; April-May, 4/9½; Liverpool held for 3d. advance	.. ..	Do.	Do.	Do.
24	Firm, less active; Liverpool firm	.. ..	Do.	Do.	Do.
25	Do.	.. ..	3/7½ to 3/8	3/8½	Do.
26	Firm, good demand; Liverpool strong, dearer	.. ..	Do.	3/8 to 3/8½	3/8 to 3/8½
28	—	.. ..	3/7½ to 3/8½	3/9	3/9
29	Firm, less active	.. ..	3/8 to 3/8½	Do.	Do.
30	Steady, but quiet	.. ..	3/7½ to 3/8½	Do.	3/8½ to 3/8¾

STEAMER FREIGHTS.—(May 1st)—Steamers from South Australia to United Kingdom-Continent, full cargo rates, 32s. 6d. per ton (10½d. per bushel); to South Africa, 28s. 9d. per ton (9½d. per bushel). Parcels, Port Adelaide to London, Liverpool, 30s. per ton (9½d. per bushel); to Continent, 31s. 3d. per ton (10d. per bushel); Port Adelaide to Melbourne, 8s. per ton (2½d. per bushel); to Sydney, 10s. 6d. per ton (3½d. per bushel).

SAILER FREIGHTS.—From South Australia to United Kingdom-Continent, 30s. to 31s. 3d. per ton (9½d. to 10d. per bushel); to South Africa, 27s. 6d. to 28s. 9d. per ton (8½d. to 9½d. per bushel).

RAINFALL TABLE.

The following table shows the rainfall for April, 1913, at the undermentioned stations, also the average total rainfall for the first four months in the year, and the total for the four months of 1913 and 1912 respectively:—

Station.	For Apr., 1913.	Average to end Apr.	To end Apr., 1913.	To end Apr., 1912.	Station.	For Apr., 1913.	Average to end Apr.	To end Apr., 1913.	To end Apr., 1912.
Adelaide ...	0.77	4.37	4.72	2.96	Hamley Bridge	0.22	4.04	4.78	1.30
Hawker	—	2.64	2.38	2.17	Kapunda ...	0.27	4.36	7.31	1.44
Cradock ...	—	2.71	2.80	1.40	Freeling ...	0.63	1.05	9.28	1.65
Wilson	—	2.82	2.89	2.80	Stockwell ...	0.60	4.42	6.96	1.87
Gordon	—	5.76	2.75	1.96	Nuriootpa ..	0.59	4.52	6.33	1.85
Quorn	0.06	2.85	2.03	4.11	Angaston ...	0.76	4.43	9.04	2.21
Port Augusta	0.16	2.64	1.99	2.25	Tanunda ...	0.73	4.69	7.71	3.30
Port Germein	0.05	3.21	1.36	1.28	Lyndoch ...	0.77	4.64	6.27	2.48
Port Pirie ..	0.08	3.29	1.61	1.05	Mallala	0.52	4.02	4.37	1.61
Crystal Brook	0.13	3.43	1.53	1.72	Roseworthy..	0.52	4.07	5.11	2.05
Pt. Broughton	0.13	3.41	1.27	2.64	Cawler	0.52	4.28	4.48	2.18
Bute	0.43	3.41	2.99	1.67	Smithfield ..	0.44	3.80	5.05	1.83
Hammond ..	0.07	2.88	2.08	1.49	Two Wells ...	0.48	3.94	3.78	1.70
Bruce	0.04	2.17	1.83	1.89	Virginia	0.53	4.03	4.32	1.83
Wilmington ..	0.11	3.68	2.22	3.37	Salisbury ...	0.47	4.25	5.32	2.17
Melrose	0.23	4.98	2.44	2.69	Teatree Gully	0.69	6.27	5.12	2.99
Boocleroo Cntr.	0.14	3.47	1.81	1.38	Magill	1.25	5.56	5.43	3.04
Wirrabara ...	0.08	3.91	2.52	1.73	Mitcham ...	1.01	4.89	4.84	2.75
Appila	0.05	3.56	1.97	1.21	Crafrers	2.60	8.80	8.44	5.25
Laura	—	3.83	1.59	1.20	Clarendon ..	0.88	6.86	6.17	3.64
Caltowie	0.07	3.70	2.39	1.27	Morphett Vale	0.37	5.18	5.39	1.86
Jamestown ...	0.07	3.65	2.54	2.12	Noarlunga ..	0.27	4.38	3.60	1.56
Gladstone ..	0.33	3.51	1.79	1.05	Willunga ...	0.83	4.92	6.60	2.79
Georgetown...	—	4.06	1.75	1.89	Aldinga	0.57	4.64	4.85	1.71
Narridy	—	3.88	1.27	1.57	Normanville	0.62	4.06	4.64	1.76
Redhill.....	0.16	3.57	2.85	2.04	Yankalilla ...	0.83	4.71	6.60	2.59
Koolunga....	0.18	2.61	1.99	1.45	Eudunda	0.26	3.59	6.44	2.55
Carrieton ...	—	2.71	2.13	1.34	Sutherlands ..	0.29	—	3.77	2.10
Eurelia.....	—	2.95	1.68	1.94	Truro	1.06	1.09	9.22	2.24
Johnsburg ...	—	2.14	2.15	1.54	Palmer	0.32	—	6.29	1.73
Orroroo	0.03	3.47	2.45	1.82	Mt. Pleasant.	0.84	5.16	6.88	1.87
Black Rock...	0.01	3.10	2.57	1.17	Blumberg ..	0.58	5.78	2.82	2.56
Petersburg ..	0.07	3.22	4.27	2.23	Gumeracha ...	0.78	4.99	5.73	3.20
Yongala	0.11	3.14	2.17	1.36	Lobethal ...	1.01	6.27	5.91	3.38
Terowie	0.14	3.17	2.96	1.60	Woodside ...	1.34	5.57	6.39	3.13
Yarcowie	0.09	3.19	4.03	1.94	Hahndorf ...	1.79	6.29	7.67	2.80
Hallett	—	3.45	3.51	1.47	Nairne	1.34	5.69	6.21	2.75
Mount Bryan	0.03	3.01	4.65	1.56	Mt. Barker ..	1.32	5.70	7.23	2.68
Burra	0.16	3.72	3.62	1.63	Echunga ...	1.10	6.15	6.18	3.48
Snowtown ...	0.33	3.46	2.70	2.21	Macclesfield..	1.26	5.74	8.39	2.88
Brinkworth ..	0.08	3.15	2.72	1.19	Meadows.....	1.30	7.07	7.89	3.54
Blyth.....	0.01	3.75	3.25	1.85	Strathalbyn..	0.62	3.93	6.97	2.88
Clare.....	0.06	5.00	3.98	2.51	Cailington ..	0.65	3.70	5.00	1.44
Mintaro Cntrl.	0.19	4.14	4.01	1.76	Langh'me's B.	0.37	3.56	4.10	1.46
Watervale...	0.40	5.54	6.38	2.73	Milang	0.28	3.83	3.51	1.72
Auburn	0.29	5.08	4.09	2.55	Wallaroo ...	0.18	3.23	2.56	2.25
Manoora ...	0.32	3.75	3.59	1.99	Kadina.....	0.43	3.71	2.67	2.33
Hoyleton ...	0.29	4.27	2.53	0.96	Moonta	0.34	3.56	1.83	2.57
Balaklava ..	0.25	3.90	2.61	1.44	Green's Plns..	0.49	3.26	2.07	1.41
Pt. Wakefield	0.17	3.57	2.41	1.94	Maitland ...	1.15	4.05	3.82	2.06
Saddledworth..	0.20	4.53	4.62	2.03	Ardrossan ...	0.88	3.08	3.20	2.39
Marrabel ...	0.18	4.18	4.56	1.41	Pt. Victoria..	0.48	3.18	1.73	2.47
Riverton ...	0.36	4.46	5.39	1.73	Curramulka...	0.53	3.67	2.90	2.45
Tarlee.....	0.39	4.06	5.08	1.99	Minlaton ...	0.22	3.42	2.05	2.28
Stockport ..	0.40	3.86	5.14	1.74	Stansbury....	0.89	3.45	3.57	2.83

RAINFALL TABLE—*continued.*

Station.	For Apr., 1913.	A'v'ge. to end Apr.	To end Apr., 1913.	To end Apr., 1912.	Station.	For Apr., 1913.	A'v'ge. to end Apr.	To end Apr., 1913.	To end Apr., 1912.
Warooka....	0.70	3.02	2.31	2.39	Bordertown...	1.28	4.06	5.74	1.16
Yorke town .	0.41	3.27	1.75	2.89	Wolsley ...	1.88	3.73	4.74	0.69
Edithburgh .	0.72	3.46	2.92	2.50	Frances ...	1.17	3.95	4.57	2.24
Fowler's Bay.	0.13	2.44	4.44	1.98	Naracoorte .	1.40	4.41	4.69	3.14
Streaky Bay.	0.64	2.85	3.80	1.90	Lucindale ..	1.27	4.34	3.75	3.76
Port Elliot.	0.36	2.63	1.69	2.26	Penola.....	0.85	5.24	4.11	6.17
Port Lincoln.	0.33	3.64	2.38	5.85	Millicent ...	0.94	5.88	5.92	5.43
Cowell	0.39	3.15	1.27	3.60	Mt. Gambier .	1.09	6.54	6.41	6.85
Queenscliffe...	0.44	3.24	2.64	3.31	Wellington .	0.52	3.75	4.58	1.34
Port Elliot .	0.57	4.35	4.00	2.98	Murray Brdg.	2.56	3.61	6.88	0.81
Goolwa.....	0.53	3.85	4.19	3.29	Mannum ...	0.23	3.11	4.51	0.98
Meningie ...	0.87	3.90	4.28	2.29	Morgan	0.12	2.36	2.47	1.65
Kingston....	0.71	4.58	4.45	4.06	Overlnd. Crnr.	—	3.07	4.83	4.06
Robc	0.85	4.46	3.70	3.74	Renmark ...	0.09	2.69	4.95	1.21
Beachport...	1.44	5.21	5.72	3.65	Lameroo ...	1.03	—	5.50	1.02
Coonalpyn ..	0.85	3.76	5.09	1.71	Tintinara ...	0.66	—	—	—

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Department reports on May 2nd—

BUTTER.—Owing to the favorable rains, the supply of cream has been very good for this period of the year and is also of good quality. In consequence of this the prices are lower than at the end of last month, the present prices being—superfine, 1s. 2d.; pure creamery, 1s. 1d. per lb.

A. W. Sandford & Co., Limited, report on May 1st—

BUTTER.—The month of April has shown a very distinct improvement in quantities as against the corresponding month last year, and for top qualities the demand is brisk, though second and third grades find a dragging sale at lower rates. Best factory and creamery, fresh in prints, 1s. to 1s. 2d. per lb.; choice separator and dairy, 10½d. to 11½d.; store and collectors', 7d. to 8d. per lb.

EGGS.—A decided shortage is being experienced, with the result that values show a further improvement of 3½d. per dozen on the end of last month's quotations. Prices now are—guaranteed new-laid hen, 1s. 7d. per dozen; duck, 1s. 7½d.

CHEESE.—The lower London butter market influenced greater quantities of milk towards cheese instead of into butter, and rates are therefore easier, though a good sale is going through.—Present values are 6½d. to 7d. per lb. for large to loaf.

HONEY.—A good turnover has been experienced in this line, with quotations unaltered. Prime clear extracted, 2½d. to 3d. per lb.

ALMONDS.—The forwardings have not been equal to requirements, many holders not being willing to accept prices offered. Brandis are selling at 5½d.; mixed soft shells, 5d.; hard shells, 2½d.; kernels, 1s. 2½d.

BACON.—Supplies of pigs have been very short throughout the Commonwealth, resulting in high figures ruling. However, at the end of the month rates displayed an easing tendency. Best factory-cured sides, 9½d. to 10½d. per lb.; hams, 10d. to 11d. Well cut and cured farm filchets and rolls, 6d. to 7d.; country hams, 8d. to 9½d.

LIVE POULTRY.—Extensive business has been put through in this line, and although each market recorded increasing quantities, the demand readily cleared all offering, prices being well maintained. Good table roosters brought 2s. 9d. to 3s. 4d. each; nice-conditioned cockerels, 2s. to 2s. 6d.; hens and light cockerels, 1s. 2d. to 2s. 5d.; ducks, 2s. to 3s.; geese, 3s. 6d. to 4s. 6d.; pigeons, 6d.; turkeys, from 8½d. to 9d. per lb. live weight for medium to good table birds.

POTATOES AND ONIONS.—There has been a satisfactory supply of potatoes, and the samples now offering are an appreciable improvement on those which were obtainable earlier in the year. The main crop in Victoria is now being dug, and this will probably have a steadying effect on prices for some time to come. Onions.—Inter-State inquiries for onions have now ceased, and as there are fair supplies available, values have a tendency to recede. Potatoes.—Gambiers, £7 per ton on trucks, Adelaide or Port; locals, 7s. 6d. per cwt. in the market. Onions.—Prime Gambiers, £7 10s. per ton on trucks, Adelaide or Port.

AGRICULTURAL BUREAU BRANCHES.

SUGGESTIONS FOR WORKING.

By GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

"Organization is system, the lack of it is confusion." So said a great organizer, whose success proved him worthy of the name. Without organization and method energy is wasted and effectiveness is lost. This is true of institutions both large and small, and in a Branch Agricultural Bureau with but a dozen members there is need to plan the work and then to work the plan.

The object of this article is to offer some suggestions which may be helpful to those men to whom the Agricultural Bureau and the State owes much—the honorary secretaries of Branches, upon whom the bulk of the work of this splendid society of producers has fallen for a quarter of a century. Some of these suggestions have been successfully acted upon in the past. A few, so far as the writer is aware, have not yet been tried in the Bureau, but have been useful in similar organizations.

OFFICERS.

The success of a Branch depends very largely upon the chairman and secretary. The former must conduct the meeting in a business-like manner, or business-like men will not become members, and business-like men are the men needed. The secretary must be a live man, or you cannot well have a live Branch. If you are chairman or secretary, and can do as well as anyone else you know, for the sake of the Bureau, stick to it. If you can see a man who will do better, get him into office when an opportunity occurs. A good farmer can always be a useful member, whether he be in or out of office. Do not be too anxious, however, to hand over your official position to another. Too much modesty in respect of one's ability is almost as fatal to effective work as too little. Self-confidence is very different from self-conceit. A healthy though modest appreciation of your own ability to run your Branch will be one of the biggest aids to success. Running a Bureau, however, is like most other concerns, "no work brings no results." The ideal secretary is the man who gets all the others working, and to do this is the hardest work of all.

MEETINGS.

Meetings should be considered before membership, because good meetings must be a condition of large membership. A few of the Branches hold all their meetings at the homesteads of the members, visiting each in turn. The majority, however, find it advantageous to have a regular place for the ordinary meetings. The time of meeting should be fixed to suit the convenience of the majority. If evening meetings are preferred, it is a good plan to have a stated night before the full moon in each month. If a regular time is thus fixed members are more likely to avoid making other engagements which would clash. Many of the Branches have afternoon meetings, and members invariably find that, although they themselves have to leave farm work for the half-day, the time is profitably spent and the break is warranted.

The secretary should have an agenda paper written up somewhat as follows:—Agenda—Minutes of previous meeting; apologies for non-attendance; business arising from minutes; correspondence, &c.; paper by Mr.; subject; discussion 4 any other business

Members giving a paper or discussing any subject should be required to address the chairman, and reasonable control should be exercised by that gentleman to prevent the discussion from drifting away from the subject and becoming merely a desultory conversation. Other matters, such as method of voting upon resolutions, &c., must be decided by each Branch in accordance with the pleasure of the majority.

PROGRAMME OF MEETINGS.

A plan of meetings for not less than six months should be arranged in advance by a small committee, including the chairman and honorary secretary. The advantages of this practice are many. Seasonable subjects should be chosen, and the men best able to deal with them be requested to make themselves responsible for the papers on the allotted days. The plan for six or twelve months should be written up on forms supplied from the head office and *a copy placed in every member's home*. To facilitate this the secretary to the Advisory Board will gladly have the necessary number of forms filled in by a typewriter if a copy is sent in. This practice, if adopted by all Branches, would keep the coming meetings and subjects for consideration before every member, and if displayed by members, would establish an excellent advertisement for the Agricultural Bureau in over 3,000 farmers' homes. Stamped post cards, for calling members to meetings, are supplied to all hon. secretaries, and one should be sent to each member every month.

DISCUSSION AND REPORTS.

Every effort should be made to encourage full discussion of the subjects introduced; for, while addresses and papers are of much value in themselves,

the greatest benefit is derived only when exhaustive discussion is promoted. It is important to look all round a subject; and, for the mutual benefit of members of the Branch and readers of the published report, the fullest expression of opinion or relation of experience should be encouraged. The secretary should take notes of the points raised in the discussion, and as soon as possible after each meeting, while events are fresh in his memory, write his minutes and reports for publication. Formal matters need not be recorded in the report, but the discussions respecting practical propositions and problems should be given fairly fully. If this is done the editor is enabled to publish a comprehensive report, creditable to the Branch and instructive to other members of the Bureau.

The papers read, with notes of the discussion and any other business transacted, should be forwarded to the Secretary to the Advisory Board as soon as practicable after each meeting.

ANNUAL MEETING.

At the annual meeting, after the report has been read and adopted, the chairman should declare all offices vacant, and the election of officers should follow. It is due to the members that the opportunity should thus periodically be given to elect fresh officers, or to re-elect those whose successful and loyal work renders such a course expedient. It is also due to the officers themselves that this opportunity should occur for them to take a well-earned release from executive work, and that the members should each year be compelled to face the question of the election of the men best able to further the interests of the Branch.

HOMESTEAD MEETINGS.

The practice of meeting occasionally at the members' homes is a good one. It provides object lessons and opportunities to discuss problems of cultivation, manuring, &c., in the fields and among the crops. It also fosters the care of implements and other equipment, and an orderly management of the farm. Both the visitors and the host gain a good deal from these periodical homestead meetings. It is very wise, however, to make time at these meetings for the transaction of any necessary business and, if possible, for some paper to be read and discussed.

THE SOCIAL SIDE.

The annual meeting and those held at the farmers' homes give opportunity for social intercourse, which is a feature of importance in the Bureau system. This has meant a great deal to scores of pioneers in new country, who have not only gained practical hints at the meetings, but have been encouraged and fortified in their strenuous and sometimes disappointing work by their contact with other hardy sons of the soil, and the friendships thus formed.

Some Branches have a regular social evening or a banquet after the annual meeting, in which the ladies play an important part; and some recognition, if only a verbal acknowledgment, is made of the indebtedness of the men upon the land to those members of the gentler sex whose residence and patient toil in the farm home render the occupation of the land possible and profitable.

MEMBERSHIP.

It is better to have a small roll of effective members than a large one burdened with the names of men who take little interest in the work. In most districts, however, it is possible for a Branch to consist of a fairly large body of producers who appreciate the advantages of membership, and who do their share to make things go with a swing. As has been suggested, the way to maintain interest is to have good meetings. Possibly your Branch has achieved this object, and still lacks numbers. If there are men in the district who are not members of the Bureau, the adoption of some of the following suggestions may help to swell the roll.

Have an Increase Campaign.—Every member should be constantly on the lookout for a new member, but sometimes it is necessary to systematise this phase of the Bureau's work. Call a meeting on the regular day, or, if thought well, on an off day, for the special purpose of planning the work. Let each member come with a list of names of the farmers situated nearest to him who are not members. Let the chairman take the longest list and call the names, while members who have any of these upon their lists cross them off. The papers may now be handed to the chairman, who will have a fairly complete list of the non-members in the immediate district. Remember that you want these members for their own good and for that of the State, and not for personal reasons. Go through the list again and remove any that are undesirable. Now allot these men among your members for a personal invitation on behalf of the Branch. Some will not come upon receipt of one invitation. If such a man is worth having he is worth getting. Let Jones invite him to-day, Brown to-morrow, and Robinson the next day; and, seeing that you mean business, you will probably get him in the end.

While it is important to secure as members the experienced and successful men, it should not be considered that the Bureau is to consist solely of the best farmers. The primary object of the system is the dissemination of knowledge, and the beginners as well as the older men should be urged to join. All have to begin, and it is a matter for congratulation that in South Australia the more successful farmers are ready to give others the benefit of their experience. Again, as much is learned from failures as from successes. There is therefore room in the Bureau for the most inexperienced farmer, and such a man should never hesitate to relate his mistakes, as others present at the meetings may have made a similar one, while others again may know how to remedy it.

A pamphlet setting out the objects and advantages of the Bureau has been prepared, and this will be found useful when an "increase campaign" is being conducted. Copies may be secured for distribution by each member upon application to the head office. During the progress of the campaign each member should be called upon at the monthly meeting to report progress respecting the men allotted to him.

While men should be urged to join the Bureau, it should be made plain that membership is not conferred lightly. Intending members should be required to attend two successive meetings before election. The rules respecting membership should be strictly observed.

DEFINITE WORK.

Every Branch of the Bureau should set itself to do some definite work. Debates and discussions are good, but example is better than precept. The Bureau should set an example of good farming to the whole district. The problems that puzzle the producer are so many that there is almost boundless scope for experimental work. One man cannot successfully experiment in many things; but many men may each test one thing, and then all may learn the results. Although it is true that conditions vary considerably between one farm and another, within certain wide limits the cultural practices that give the best results on one farm are likely to be conducive to high yields in other parts of the immediate district. In the large tracts of new country now being opened up for cultivation so little has been proved in respect to the most suitable varieties of wheat and other cereals, the best depths and modes of tillage, the right kinds and quantities of manures, that these problems constitute a challenge to the Bureau to systematise its work, that it may wrest from nature reliable data upon which to base the more important operations in winning a livelihood from the soil. This need for practical testing exists in every phase of agriculture. Be it cereal growing, sheep farming, aviculture, horticulture, viticulture, dairying, or what not, there are secrets to be revealed if only the farmer will systematically set himself to discover them.

In the Bureau, then, let "A" test how large a quantity of super. he may apply to his land and still reap a profit in the enhanced yield, enriched soils, and stock feed. Let "B" test varieties of wheat or other crops best suited to his conditions. Let "C" test the tillage depth that gives the best return. Duplicate these tests where several types of soil are found in the district, broadly classifying the types for the purposes of the experiment. There will be no difficulty in discovering many matters which may be tested, and there should be no hesitancy on the part of the majority of members, when once their farms are fairly well established, to do some of this work.

ESSENTIAL CONDITIONS.

It is of the utmost importance that ordinary care be exercised to have areas accurately measured, weights exact, and conditions generally as uniform as possible for this experimental work ; but the amount of work involved in testing one of the many problems should not present any serious difficulties to the man whose ordinary practice and farm management entitles him to be termed a good farmer. One other factor to be mentioned is the necessity for the continuance of experiments for, say, three, or even more, years. Thus will disturbing influences of varied seasons be reduced to a minimum, and a comparison of the average results will reveal those practices and operations which will be most likely to result in the highest gain to the farmer.

ODDS AND ENDS.

Every Branch should have a library of useful reference books. The *Journal* should be bound with the index and placed on the shelves each year for members' use. A standard veterinary book of reference, a volume on soils and another on manures, in addition to many works suited to the agriculture of your district, should find a place in the library.

Some Branches *are* sleepy, and it is well to face the fact. You know whether yours is one of them. If so, call a special meeting of the few who feel that the Bureau is worth while, and read over these suggestions. Sink personalities, and make decisions and plans for the Branch. When you have inspired fresh life, deal with the section on "Work for the Bureau." If you do this you will soon have little cause to complain of lack of interest. Your homestead meetings and visiting days will be more instructive and more interesting than ever before. You will have ample material for discussion and consideration, the only difficulty will be to find sufficient time to do it.

RULES.

The general rules applying to all Branches are—

1. Political and religious discussions are not permitted in Bureau meetings.
2. One-third of the members who have attended the least number of meetings during the year retire at the annual meeting. Such members are eligible for re-election by the Advisory Board if recommended by the Branch.
3. Any member who is absent from three consecutive meetings without sending an apology, or unless he has been granted leave of absence by the Branch, should be removed from the roll.

PLANT PESTS AND WEEDS.

SPECIMENS FOR IDENTIFICATION.

Notes by T. G. B. OSBORN, M.Sc., Professor of Botany and Plant Pathology, Adelaide University.)

The number of specimens of weeds and plant pests forwarded to the Department of Agriculture for identification is a significant indication of the growing importance of the Agricultural Bureaus to the farming community throughout the State. Since the specimens are not infrequently collected in such a way that their ready identification is rendered difficult, or in some cases impossible, the following notes have been prepared at the request of the Editor as a guide to those desiring information.

The specimens received for examination may for convenience be divided into two classes, and, though the same general principles apply to each, they may best be treated separately.

I. WEEDS AND OTHER PLANTS FORWARDED FOR IDENTIFICATION.

The specimens collected should be as complete as possible. Where practicable entire plants should be forwarded. In the case of bigger plants examples of the leaves, including any that may grow at the base of the plant direct from the roots should be included.

It is very difficult to name plants that are not in flower. Where practicable fruits and seed pods should also be sent, for many plants cannot be accurately named unless these are included.

Some rough form of pressing is desirable where possible. If good representative specimens were laid flat between pieces of blotting paper, rough brown paper, or even newspaper, and a slight weight, say a large book, left upon them for a couple of days before posting, it would generally mean that the samples would be received in better condition. Any loose flowers, fruits, or seeds should be wrapped in an envelope or a piece of paper (those from each kind of plant separate) and the whole forwarded in a long envelope or brown paper package, with as little crushing as possible. A piece of thin cardboard should be folded round them to prevent damage in the post.

The same general principles apply to bigger plants. Where whole plants are not sent the height and habit of the plant (*i.e.*, bushy, shrubby, erect, &c.) should be stated in the covering letter. In these cases also flowers, leaves, and, where possible, fruits should also be included.

If attention were paid to these points the actual bulk of the samples forwarded might even be decreased, while their utility would be greatly increased.

II.—SPECIMENS OF DISEASED PLANTS.

The examples of these are often insufficient for the reason that the fungus may appear in the fruiting condition some distance from the apparent seat

of injury. An instance may be cited in the case of "white heads" of wheat. The fungus producing this is the same as that causing "takeall." The fructification in both cases appears on the base of the stem and roots. But in the case of the former disease the natural thing to do would be to forward the withered ears only, with the result that the fungus could not be determined.

Where practicable complete plants, including roots, should be forwarded. In many cases some rough form of pressing, as suggested above, would be an advantage. If delivery can be insured within 48 hours after posting, specimens might be put into tin boxes (*e.g.*, tobacco, tea, or cocoa tins) packed firmly with the leaves of the plant or fresh grass, and the lid closed tight.

Fruits or roots might be similarly packed. The packing of specimens forwarded in tins might with advantage be *slightly* damped, but it is better to put no water than too much. This would only encourage the growth of moulds and other fungi.

Not only the most obviously diseased specimens should be sent. Some of these, of course, should be included, but also less damaged examples should be forwarded, even those that appear almost sound.

It would be an advantage if all specimens were collected early in the morning or towards sundown. Samples should never be gathered and left about all day before putting to press or into tins.

METHOD OF FORWARDING INSECTS FOR IDENTIFICATION.

(Notes by A. M. LEA, F.E.S., Curator in charge of Entomology S.A. Museum.)

In sending mature insects for identification, all that is necessary is to place them in small tins or wooden boxes, securely wrapped, so that the insects cannot escape. For immature specimens such as grubs, caterpillars, maggots, or other larvæ, it is very desirable to send some of the food-plant as well, so that the specimens may be reared to maturity, as it is often impossible to name specimens without knowing the mature form.

All such small parcels should be posted direct to the South Australian Museum and marked as containing insects. Otherwise, delay might arise and the insects perish before examination.

The Museum at present has not a representative collection of the principal insect pests of South Australia; and it is very desirable that such a collection should be made for exhibition purposes. It is hoped, therefore, that farmers, orchardists, and stockowners will send in any pest that they may notice, so that some idea may be formed as to the numbers and distribution of our principal pests. More especially is it desired to receive pests of growing wheat from all parts of the State.

AGRICULTURAL BUREAU OF S.A.

CONFERENCE OF NORTHERN BRANCHES.

(Continued from page 1027.)

Afternoon Session.

THE FARM GARDEN AND PLANTATION.

This formed the subject of an interesting address by Mr. Geo. Quinn (Horticultural Instructor), who said that it was not with the idea of carping on the absence of gardens throughout very wide areas of the farm lands of the State that the subject had been chosen. Rather, he desired to draw attention to the fact and express regret thereat.

In most of the districts favored with 20 in. and upwards of rain per annum, the earliest settlers had left evidences that they had not forgotten the instincts of tree and hedge planting. The generation which had succeeded them on the farm, however, seemed to have almost entirely failed to imbibe the desire to settle down and surround the homestead with trees and garden plants, and had it not been for the influences of the women folk it was safe to say much less would have been done than had been the case.

The second generation of agriculturists displayed a much greater desire to get rich by broad cropping. They hoped to retire from the land, rather than to surround the homestead with the civilizing influences which were inseparable from horticultural studies. Owing to a combination of circumstances only too well known, this second generation did not, as a general rule, realise their ambition; and in many instances they were forced to retire heartbroken and ruined financially before the brighter era for the agriculturist came with the advent of summer-worked fallow, the fertiliser and drill, the cream separator, and the frozen lamb trade. Whilst it might have been idle to have talked gardens to men who were in a position analogous to that of a ship on a lee shore, the present was an opportune time to bring the subject forward.

The effects which had followed upon the improved processes and practices referred to had caused farmers to approach such subjects as this in quite a different mental attitude. The man on the land had realised that success in his calling was not solely a question of brawn and muscle and blind adherence to stereotyped routine. The present-day farmer had learned his lesson in a

hard school of experience, but the generation now rising to responsible age was receiving much of that knowledge by a shorter route.

The farm garden should be just what the conditions of climate and soil permitted. In the more arid parts, where natural moisture from rainfall was scanty and water for irrigation unobtainable, it might resolve itself into a few sheltering trees, such as the despised pepper tree, the sugar gum, the Aleppo and native pine, whilst closer in hardy shrubs, such as native acacias (or wattles), and hakeas might be grown along with such drought-resisting plants as the oleander, tamarisk, rhamnus, and others.

The farm homestead was often placed on a hill—high, dry, and healthy—and the site for the garden was mostly determined by such considerations. If, however the site might be chosen, he suggested that for districts receiving less than 20in. of rainfall yearly, the low-lying land had advantages; whilst, with an increasing rainfall, the garden should ascend the hillside. The small area required for a farm garden might be enriched by manuring, therefore moisture was usually the main consideration.

SHELTER.

The provision of shelter from cold or hot winds was desirable, perhaps more against their mechanical violence than variations of temperature engendered by their movements. There was a good range of hardy shelter trees from which to select, and the drier and shallower the soil the greater distance should be observed between the sheltering trees and those plants to be set for the production of fruit, flowers, or vegetables.

In the shallow limestone soils at Roseworthy College, sugar gums injuriously affected the fruit trees and other plants over a distance of 75ft. The Aleppo pine and the pepper tree were less far-reaching. The former thrived in shallow, lime-impregnated, dry soils, whilst the latter showed a preference for a clay subsoil. These trees should be planted fairly closely together, say 20ft. for the former and 10ft. for the latter, and at least 60ft. back from fruit trees, unless the soil were deep and moisture plentiful. A narrow belt of two or three rows closely set was always preferable to a single line of trees.

In a windy locality such a belt might with advantage be carried right around the homestead with comfort and advantage to the inmates, as well as to the increased beauty of the place. Experience had shown that in districts with a low rainfall trees planted for shelter purposes would rise to a useful size in about one-half the time if the whole surface of the land between them were cultivated carefully during the first few seasons to conserve the soil moisture. It was perfectly useless attempting to grow a plantation of trees or garden plants unless small vermin, such as rabbits and hares, were netted out, and care was taken to keep gates closed to prevent the wandering pet lambs, or poddy calves, or stray horses and cows browsing upon the trees.

PLANTING FOREST TREES.

The shortening of the firewood supply was of very grave importance. During the past 18 years prices for wood in the city had risen from 16s. 6d. to 31s. 6d. per ton. In the majority of the agricultural colleges of America a course dealing with the farm forestry was included in the curriculum, and it was a regular practice in the older States to conserve on the farms an area of wood land that was systematically worked. It was quite time the South Australian farmer took steps to ascertain what area of the farm could be economically devoted to this purpose. The preparation given a well-worked fallow was the best means of treating land for the planting of forest trees. The land should be fallowed well in the winter, and if possible subsoiled with a plough from which the mouldboards had been removed. Where there was a danger of frosts, early planting would not perhaps yield the best results, otherwise it was advisable. Fruit trees were much more tender than forest trees, and taken on the whole they required much more nursing during the first years, and more suitable conditions for root action. It was desirable in almost every instance to prepare the ground deeply. The kinds of trees planted should be determined by the climatic and soil conditions. Stone fruits and grape vines might be expected to thrive better on clayish loams than on land underlaid with limestone. The pear and the apple required, if anything, more clay. Citrus fruits required looser soil and better drainage. As a general rule it might be taken that the richer the soil the wider apart the trees should be placed to ensure room for development. The question of moisture also should be considered. Where the rainfall was 20in. it was not advisable to put the trees less than 20ft. apart.

SHELTER TREES.

There was a fairly large range from which to select trees for shelter or timber purposes. The sugar gum was a very useful tree in its place. The pepper made a fine shelter, and bull oaks would be found to thrive in dry, sandy land. The Aleppo pine was the best of the family for dry conditions and soils charged with limestone. The Remarkable pine was likely to die out in dry seasons in the North. It was a common sight to see land carrying trees well cultivated excepting just around the base of the trees. Where this surface was left unbroken a great deal of moisture would be lost. In the early stages of their growth, an hour of two spent in caring for and straightening any trees that showed a tendency to crooked growth would be well repaid. Severe pollarding was to be deprecated. It was far better, where the trees were required to afford shelter, to systematically top them.

FRUIT TREES.

Attention in the early stages of their growth was of supreme importance to fruit trees. When planted, the young tree should be about the thickness

of a finger, and 2ft. 6in. in height. The first operation of pruning was of supreme importance. It was necessary to preserve a balance between the root system and the branch system, bearing in mind the fact that the nurseryman frequently, in lifting the tree, broke some of the roots. Stone fruits might be cut back to a bare standard about 12in. or 15in. high. It was not advisable to cut apples and pears so severely.

TREATMENT OF THE SOIL.

The system of tillage adopted should be based to a considerable extent on the annual rainfall. Land receiving, say, 25in. per annum yielded best results when ploughed early in winter, and lightly ploughed to bury the weeds in the spring. The harrows or cultivators should be used in the summer. Where the rainfall was above 25in. the land was usually of a hilly nature, the soil being inclined to wash. Therefore the growth of weeds should be encouraged until the team could be got on to the land in the spring, when it should be broken before the surface had time to cake, and from that time throughout the summer the surface should be kept loose and pulverized.

DELEGATES' VIEWS AND QUESTIONS.

Mr. E. Moss (Salisbury) desired to know the relative values of sugar gum and red gum for timber purposes.

Mr. Quinn said it was somewhat difficult to determine this point, as it was hard to secure trees of similar ages. It was generally recognised that timber from young trees would not last so well as that from older trees. The sugar gum timber was very serviceable out of the ground where it was more or less sheltered from rain. On the West Coast the mature timber stood well as posts.

Mr. J. P. Schultz (Riverton) had cut trees which were planted in the same year, and the red gum timber outlasted the sugar gum out of the ground.

Mr. J. E. Pearce (Whyte-Yarcowie) mentioned that trees grown from the seed on the spot would be found to resist drought conditions much better than those which were procured from a nursery. He desired to know the best means of planting carobs.

Mr. Quinn replied that the raising of carobs from seed was uncertain, owing to the sex question, and the budding was a more difficult matter than it appeared. The very best way, therefore, was to grow them from truncheons.

Mr. C. Fowler (Yongala Vale) inquired whether it was advisable to plant carob trees in districts subject to frosts all the year round.

Mr. Quinn said carobs were hardier than sugar gums in so far as frosts were concerned.

Mr. J. McAuley (Georgetown) suggested that almond trees would be more remunerative than sugar gums.

Mr. Quinn drew attention to the fact that the almond would not fruit in certain localities, although it would grow almost anywhere. About Orroroo they were very profitable.

Mr. F. Coleman (Saddleshworth) 16 years ago commenced the planting of trees and flowers when he took over the farm which he occupied at present. He had been very successful, and eloquent testimony was borne to the ability of the district to produce flowers by the presence in the hall of some excellent blooms which had been grown by Mr. Coleman.

MIXED FARMING.

A paper under the title of "The Age of the Specialist" was read by Mr. W. J. Dawkins, of the Gawler River Branch. This had already appeared in the *Journal* on page 900 of the March issue.

Mr. F. H. Kelly (Saddleshworth) delivered an interesting address. At the present time, he said, he held 400 acres of land. He left 100 acres of this under permanent grass, 100 acres were cropped each year, 100 acres being fallowed, and 100 lying out. He kept a flock of pure Merino sheep, and during the winter months hand fed them. He found that one bag of chaff and two of straw per day would keep from 100 to 110 sheep through the lambing. The cow, he thought, was the most profitable animal that he kept on the farm. The farmer was well advised to keep fowls, an excellent grain for which was White Champion oats. He had secured up to 18 bags per acre from this crop on fallow. On 400 acres he kept 200 sheep, 15 head of cattle, and 10 horses. Last year his wheat crop had averaged 30 bush, and the hay 3 tons to the acre.

OTHER OPINIONS.

Mr. Jenkins (Whyte-Yarcowie) was quite satisfied that if farmers throughout the greater portion of the State were to specialise in any one branch of agriculture they would make a great mistake. If those men on the fringe country were to put all their efforts into wheat-growing and that failed they would get nothing at all, but if they had a flock of sheep, and gave a certain amount of their energy to these, they were certain of some return at shearing. The farmer should have more than one string to his bow, and should use the different strings with common sense.

Mr. J. H. Dawkins (Gawler River) agreed that it was advisable for a farmer to specialise in that particular branch of agriculture most peculiarly suited to his conditions. Other lines could be worked, but these should take a secondary place.

Mr. D. Lloyd (Clare) said a system of mixed farming suitable to one district would very likely be quite unsuitable for another.

Mr. S. Eyre (Georgetown) believed it advisable for the farmer to keep a flock of sheep, and also to breed his own horses.

FARMERS' CLIPS.

The Wool Instructor of the School of Mines (Mr. Henshaw Jackson) delivered an instructive address. With the aid of diagrams on a blackboard he

illustrated the manner of the growth of the wool. Enlarged drawings of four different types of wool, viz., Leicester, Lincoln, Shropshire, and Merino, were shown. The quality of the wool, he said, was likely to suffer through crossbreeding to secure export carcasses. The crosses most frequently advocated were the Leicester or the Lincoln on the Merino, afterwards introducing the Shrop. or the South Down as a second cross. Personally he favored the Lincoln-Merino cross. If they went on breeding back to either the Leicester or the Merino they would be all right, but there was a great deal of difference in the wool of the other breeds. With the introduction of the third cross on the cross already made the carcass would be good, but the wool would very likely suffer. Some eight or nine years ago the Australian cross-bred wools were found to be faulty in spinning capacity. The length of yarn could not be got out of the wool. It was discovered that the cells of the wool fibre had materially altered in shape and size.

CLASSING.

Generally speaking, wool for manufacture was divided into two classes, viz., long and short. The worsted industry used the former, and the woollen the latter. This fact emphasised the necessity for classing. If they did nothing more than keep the long staple fleeces from the short they were wool-classing to a degree. The simplest plan was to match the wool by taking out the best, brightest, and longest fleeces for one class, the next best for another, and the inferior for a third. Proper skirting was advisable, as vegetable matter should be kept out as much as possible. If the wool were full of clover burs, skirting would serve no useful purpose; trimming only was required. The quality of the wool meant its capacity for being spun into fine thread. It was to this point that the buyer first looked. He next ascertained the clean yield of the wool, which simply meant that he estimated the amount of clean, dry wool for manufacture which a given quantity of greasy wool would yield. The methods of manufacture of the worsted and woollen trades were traced by the lecturer.

THE DISCUSSION.

Mr. R. E. Lines (Gladstone) expressed the opinion that if Mr. Jackson could get out amongst the farmers when they were shearing, considerable good would result. A practical demonstration given in his shed last year by Mr. Jackson had been of immense benefit to him.

Mr. J. H. Dawkins (Gawler River) asked whether it was advisable to put up a clip into many classes.

Mr. Jackson recommended taking out the best fleeces and putting these together, keeping the short from the long. Further than this it was only necessary to make sure there was as little vegetable matter as possible in the fleece.

FEEDING OFF PEAS.

Mr. J. E. Isaacson read the following paper: "Field peas were grown and fed to pigs and cows in this district 40 years ago, but the demand for the products from these animals was confined to local markets, and there was really no scope for development of the industry. However, to-day the conditions are totally different. The introduction of phosphates, &c., has doubled the production, the export trade in carcass meat has added quite 100 per cent. to the value of lambs and mutton, and sheep-raising must play an important part in future operations on the land. In these old settled districts we have been content to utilise them in keeping down the weeds on the fallow and in consuming the natural grasses.

"The cultivation of lucerne in this district must necessarily be confined to small areas, owing chiefly to the undulating nature of the country and the lack of water. After two or three years of observation and experience I am convinced that there is no other crop that can be produced on the average farm, without irrigation, that will supply the means of fattening sheep and lambs as cheaply as peas. There need be no anxiety regarding the disposal of old breeding ewes, for after rearing their spring lambs on the natural weeds and grasses they can be fattened on the pea crop in from six to 10 weeks at most (according to their condition when turned on to the crop), and disposed of at good prices at a time when as stores they are practically unsaleable, viz., February and March. In July of last year I selected 25 acres of good land and ploughed it to a depth of about 4½ in. I then harrowed it down and drilled in 2 bush. of peas per acre without any fertiliser. When the plants were about 4 in. high I put a medium weight plain roller over them in order to get a smooth surface for feeding off or otherwise gathering the crop.

"The germination was apparently very good, and on the whole the season was favorable, as there appeared to be no check in the growth from start to finish, excepting on a patch of about six or seven acres, where wild oats and weeds asserted themselves and considerably choked the peas. From this patch I cut with the binder about 7 tons for hay, but this means of harvesting was not successful, and a good deal of the crop was left behind. In future I will use a pea rake, which I think costs about £6.

"On the 4th of December, by which time the greater portion of the peas were ripe and had finished producing late pods, I put on 150 sheep, half of which were lambs in forward condition, the balance old ewes in store condition. The lambs showed considerable improvement in a fortnight. I then sent them to the Adelaide market. They returned up to 14s. 6d., and averaged 12s. 7d. net per head, and I have placed 2s. per head to the credit of the peas. At this stage I turned into the crop 100 aged crossbred and Merino ewes, three cows in milk, three calves (weaners), and two head of light horses.

The horses fed chiefly upon the dry oats and other grass available between the banks of the river running through the paddock, with an occasional nibble at the peas. The cows and calves, however, soon showed a preference for the peas, whilst the milk yield increased and their condition greatly improved.

"On February 19th I marketed the 80 old Merino ewes in Adelaide, and they also sold at prices up to 14s. 6d. per head, and averaged 12s. 6d. net. They had then been on the peas 10 weeks. I credit the peas with 4s. 6d. per head increased value. On February 26th I sold in Adelaide 80 more ewes after 10 weeks feeding. These ewes were in forward condition when put on, and were prime in about seven weeks; but I held them 10 weeks, as the market was firming. They returned me a net average value of 15s. 3d. per head. Some of them made 17s. This line also gave me a profit of 4s. per head over cost price. On the 10th February I put into the same paddock 50 young sheep, mostly Lincoln-Merino cross lambs, in good condition. At this stage, of course, the peas were getting very scarce, yet the lambs held their condition, and on the 12th March were sold in the Adelaide market at prices ranging from 16s. 7d. to 17s. 4d. gross, whilst eight ewes held over from the previous consignments realised from 15s. 6d. to 18s. 6d. gross. In this case a better demand was responsible for the increased value to some extent; still I think it fair to credit the crop with 2s. per head, as the paddock helped to hold them for three weeks longer than could have been done otherwise.

"It will be seen that 160 sheep made a net gain of 4s. 3d. per head, and 125 gained 2s. per head, whilst 15 head remain unsold. In addition to this, three cows and two horses remained in the paddock for six weeks, the three calves for 10 weeks, and 7 tons of fodder was stacked. The following figures will give approximate results:—

<i>Debit.</i>			<i>Credit.</i>		
	£	s. d.		£	s. d.
Ploughing, harrowing, drilling, and rolling 25 acres at 9s. per acre	11	5 0	Profit on 80 lambs at 2s.	8	0 0
Binding and carting 7 tons fodder	2	3 6	" 80 ewes at 4s. 6d.	18	0 0
50 bush. of seed peas at 4s.	10	0 0	" 80 " 4s.	16	0 0
			" 45 lambs at 2s.	4	10 0
			7 tons fodder at 40s.	14	0 0
			Feed value to horses and cattle and 15 sheep unsold	6	10 0
	£23	8 6			
			Total	67	0 0
			Less debit	23	8 6
			Credit balance	£43	12 6

"There is a running stream on two sides of the block on which the peas were sown, and roughly about six acres of land is contained between the banks. A considerable quantity of rushes, reeds, and artichokes grow there and a good deal of picking is obtained from it. Nevertheless, when we consider that no fertiliser or manures were applied to the pea crop, and that a

large amount of droppings have been evenly distributed over the land for the benefit of the next crop, the result may be regarded as very satisfactory. Taking advantage of the recent good rains, the land has been again cultivated, and has the appearance of well-worked fallow. No doubt a crop of weeds will appear, but there is ample time to deal with them before seeding the land for hay or wheat. In my opinion feeding off is certainly the shortest route to quick and certain returns, and it has the advantage of an even distribution of the droppings over the land. In the process of gathering the crop, carting, stacking, and covering to protect it from rain, and again carting it out to the stock, considerable expense is incurred, and much larger gross returns would be necessary to get net results equal to those that are secured when the crop is fed off.

“One of the great advantages of a pea crop is that it can be grown and utilised on land that otherwise would probably have been bare fallow, yielding no return, whilst the peas are out of the way in time for a crop of wheat or hay. In my opinion they can be profitably grown upon any soil in this district, excepting limestone. I would, however, advise those intending to feed off the crop to select land that would have a firm surface by the time the crop matured, otherwise much of the corn may be buried and lost. For stacking purposes this is not so important, as the crop is gathered before the corn is ripe enough to shed out. June planting is preferable to July, as the crop then gets the full benefit of the winter rains, and may, through earlier maturity, escape hot winds at a critical time. I intend to sow a considerably increased area with this crop this year.”

HARVESTING PEAS.

Mr. H. A. Thomas in a paper on this subject said peas could take the place of grass in the ordinary three-year rotation. Little work was entailed in connection with seeding, a good burn, followed by deep cultivation, being all that was necessary. Two bushels of seed and 60lbs. of super. per acre would be found sufficient. A good crop harvested when it had reached the dough stage would fatten up to 20 sheep per acre for two months. Where the farmer intended raising lambs for export, 10 acres of peas should be grown for every 100 ewes kept. When nearly ripe, the crop should be raked and stacked. Second grade lambs which had been kept back from the market and shorn (say about 25 head), and the cast for age ewes (say another 25), should then be turned on the stubble, to be sold when the paddock was eaten out. The stack should provide sufficient for the breeding flock of 100 ewes for two months, to be fed as required.

Seed and manure would cost about 10s. per acre, and the natural grass that would have been available in the ordinary course might be valued at 10s. As the seeding was done just after the wheat was in, and the harvesting just after hay cutting and before it was ready for stacking, the labor was not

a large item. The increase in value of the 25 ewes and 25 lambs on the stubbles might be safely put down at 3s. 6d. per head, a total of £8 15s. Feed for 100 ewes through two months of the period when feed was short was worth 2s. per head, a total of £10. This showed a return of 17s. 6d. per acre. The benefit which the soil derived from the peas and the value of the even distribution of droppings from 15 to 20 sheep per acre for two months were also to be taken into consideration.

In the event of an unfavorable winter and spring, and the lambs being unfit for export, the greater part of the harvesting could be dispensed with, and the whole of the lambs and old ewes topped off. When the season was late and young lambs were dying for want of proper nourishment, there could be nothing better than a crop of peas to save the situation. With an early season and plenty of grass, the pea stack could be fed to horses and cattle, or it could be held over for a year if covered with an extra load of straw.

Evening Session.

NEXT CONFERENCE.

It was decided that the next Conference should be held at Gladstone.

SHEEP AND FAT LAMBS.

This formed the title of an address by the Director of Agriculture (Mr. W. Lowrie, M.A., B.Sc.). The production of sheep and fat lambs, he said, was the most important means practicable of profitably increasing the returns from the wheat-growing areas. The utility of sheep on the farm had been recognised by the best agriculturists for many years, and in his opinion the most satisfactory way to judge a man's work as a wheatgrower was to inspect his breeding ewes. The man who kept good sheep was never far behind the best with his wheat average. It was surprising, however, that there was still such a large number of farmers who paid no attention to sheep. Another regrettable fact was that some of those who had sheep kept them badly and carelessly. The position of the men who went in exclusively for wheat and bare fallow year after year was not nearly so good economically as that of the men who cropped their land only once every three years, and carried stock on the stubbles. Those of the latter who managed their flocks well required less labor, used a smaller quantity of hay, and possessed breeding ewes worth about £1 a head. On the other hand, the advocates of the wheat and bare fallow rotation without sheep were building up increasing trouble, because bare fallowing helped to reduce the supply of humus in the soil. If they had not already felt the pinch in that respect, and persisted in their

practice, they inevitably would in the near future. It was well to remember that they could not make up for the lack of humus merely by increasing the quantity of phosphatic manure applied to the land, or even by distributing expensive nitrogenous manures. A comment frequently heard was that by burning off the stubbles the land could be fallowed more easily. By adopting that course they would add to their troubles, and eventually get their soil into a most unsatisfactory condition for wheat-growing. Humus was vitally important and necessary to enable them to conserve the moisture in the soil to the fullest extent. As the humus content diminished the land would set harder and harder, nitrification would be impeded, and there would be less gain of nitrogen from the atmosphere.

Unfortunately there was a growing tendency among the farmers to make a few thousand pounds and then get away to the city. Farming was not only a money-making business. The true farmer found his pleasure in increasing the capacity of his holding, and improving the quality of his stock. He could not find genuine and lasting pleasure by selling out and retiring to the city and attending picture shows. There were some men, probably including himself, in the city who would be glad of an opportunity to retire to farming. Reverting to the sheep question, he had a good case, he believed, in urging farmers to give proper attention to the woolbearers. At the outset however, they should recognise that the successful man's sheep were not purchased, one truckload from this sale and another from that. That farmer made it a rule to secure an even line, because it paid best when the time came to sell the wool and the lambs. Evenness enhanced the prices appreciably. It was patent that the average standard of the fat lambs produced in South Australia must be improved. There was no reason why the lambs from this State should realise about a penny a pound less in London than those from New Zealand. That penny difference, by the way, meant 20 per cent. or more of the total value. It was a pity that, because some men were content to send in lambs little better than hares, 20 per cent. should be lost, and the reputation of the State as well as the men who supplied the highest grade stuff should suffer.

THE MERINO.

To overcome those difficulties there must, in the first place, be less of the Merino in the lambs. He knew that a large proportion of the farming community interested in sheep considered the Merino to be the only breed of importance in South Australia. While fully recognising how valuable the Merino wool industry was, it must be acknowledged that the output by the agriculturists was comparatively insignificant. The Merino sheep would ever maintain its predominance, and rightly so, in the pastoral country; but in the agricultural areas to produce lambs calculated to secure the top rates on the London market they must depart from it. There were some who

would probably say, "Let us have a bad season, and you will find the Merino go through while the crossbreeds would fail." He doubted, however, if any man present had had that experience. So far as he had been able to learn, when the pinch came it was the Merino that suffered most. There was no greater fallacy than that the crossbred or half-bred would not maintain its vitality under the most severe conditions as well as would the Merino. Then, again, it was contended that the wool of the Merino was heavier and more valuable. He agreed that that was correct where really first-class Merinos were kept, but in the case of mediocre animals he doubted very much whether it was so. During the last 10 years half-bred wool had been practically as good from the selling point of view as fair Merino. Four years ago English-Leicester-Merino wool sold up to 13d. a pound. But when they were keeping sheep with fat lambs as the main objective, even should the fleece be a little less valuable, the depreciation would be more than made up by the increased percentage of lambs from half-breds, and the better price obtained for them.

They would find it much more profitable to go in for half-bred ewes than for Merino ewes, because whereas they would get only about 90 per cent. of lambs from the latter, from the former they could confidently expect 115 per cent. or even 120 per cent. Another strong point in favor of the half-bred ewes was that their lambs reached maturity earlier. The drop occurred at the time when, under normal conditions, the feed began to come along, and the stock increased as the feed developed. Then, if managed well, the lambs could be sent away as the feed dried off, and there would remain only the ewes to carry on. Granting that the prices were equal, one would favor securing the Lincoln-Merino half-bred, but he doubted if they could be purchased at the same figure as English Leicester half-breeds. Personally, he had a partiality for the latter. The English Leicester half-bred ewe, though not such a good mother, was more shapely than the Lincoln half-bred, and comparatively the lambs were more blocky. The fleece, while not so heavy, yet had that character about it which made it of higher value. A good English Leicester was almost as attractive as the South Down. If they could be bought, he was convinced that it would pay a man better to to give 16s. or 17s. a head for English Leicester half-bred ewes than to go in for Merino ewes at 10s. each. Under proper treatment he would get three or four crops of first class lambs from them. He had seen farmers readily pay up to 34s. a head at the North Canterbury market in New Zealand for English Leicester half-bred ewes for the raising of fat lambs. If the South Australian farmers would go into the fat lamb business in real earnest they must awaken a regular demand for half-bred ewes, so that breeders in the "fringe" country would devote attention to the production of such animals to meet the requirements in the agricultural areas. Failing that, the farmers would have to raise thier own half-breeds. Where they were well up in sheep there was no reason why they should not succeed.

BREEDING.

They would have to secure some large-framed, bold Merino ewes the bigger the better—having good backs, and use on them English Leicester rams. Unless they had courage, the next step would land them in trouble. When drafting their lambs for market they must reserve, say, 60 per cent. of the very best of the ewe lambs for breeding purposes. Some of them would probably want to send the best to market and keep the late comers and the hard doers for breeding. If they did that they would inevitably fail. Only the most promising of the ewe lambs should be retained for breeding, and upon those they could employ a short-wooled ram Shropshire, South Down, or Dorset Horn according to the class of country and the conditions under which they were working, bearing in mind always the need for ensuring early maturity. It was of vital importance that every hoof of those three-part bred lambs should be sold, and that they should not be used for breeding. Unfortunately, in some instances, through improper breeding, the true characteristics of the Shropshire had been sacrificed. The best sires for the production of fat lambs were those very sheep sometimes that were discounted at the shows. A first class Shropshire ram, when handled on the back, should be like a feather bed. The blue-skinned, hard kind of animal should be eschewed, for he would be no good for their purpose. There had undoubtedly been too much Merino judging of English breeds. The first consideration in those breeds meant to get fat lambs was how they handled on their backs, not how they were covered at the points with wool. Sometimes it might suit them to use the long-wooled ram again on the half-bred ewes. If they did that they would get very creditable wool and nice-framed lambs. The best lambs he had reared were from half-bred English Leicester ewes, sired by Border Leicester rams. He then used South Down rams on the ewes, and obtained some of the finest lambs he had raised.

FORAGE CROPS.

While breeding along the right lines it was also essential that they should grow special forage crops to meet the exigencies of the different seasons. They had recently had delightful rains, and he could easily think of men in many districts immediately putting in rape, or rape and mustard. They might say, "Oh, there is going to be plenty of natural feed." All the better, for the sheep could be turned on to the rape, and the surplus grass cut for hay and stacked for use in years of drought. Where the circumstances were favorable every man with sheep, to increase the carrying capacity and enable him to secure the most satisfactory results from his lambs, should plough his land, or if that should not be feasible, disc it, and drill in with a little manure about 2lbs. of mustard and 4lbs. or 5lbs. of rape. Unless they could sow early,

however, they had better leave the rape and mustard alone, and, instead, use peas. Besides being a splendid fattening fodder, peas improved the land considerably. One reason they had not been sown more generally probably was the high cost of the seed; yet when one realised the great benefits derived from them the price was insignificant. In the eyes of some of the farmers, it seemed a lot to get back from grazing alone, and when 1cwt. of super. to the acre was added the outlay was like drawing teeth. It was a safe investment, however, therefore why hesitate? A good mixture for feeding off or cutting with a view to future use consisted of peas and oats. The seed would require to be sown fairly early. Peas and barley could be sown later, and the former would feed better for having the cereal with it. Lucerne was another fodder which could be cultivated to advantage in many localities where it was not now grown. Then there was Westernwold's rye grass which, sown at the rate of 30lbs. to the acre, would be of material assistance in the winter and through the spring. He was satisfied that if the procedure he had outlined were adopted widely and wisely the quality and reputation of South Australian lambs would rapidly advance, and they would soon be kicking the heels of the New Zealanders for top rates.

The lecturer, in conclusion, urged the farmers not to place too much reliance upon the results of some of the so-called experiments in fat lamb raising, unless they were convinced that the work had been conducted on a proper scale and with absolute thoroughness.

EX-WOOL INSTRUCTOR'S VIEWS.

Mr. G. Jeffery (Advisory Board) was entirely in accord with the remarks of the Director of Agriculture. Hitherto he had advocated breeding from the Merino ewe and one of the early maturing breeds. Nevertheless, he had fully realised that the time was to come when the half-bred ewe would have to give place to the Merino. That time had now arrived. The reasons which had prompted him to advocate the use of the Merino in the past were that they were more easily obtainable, and the ordinary farmer had not sufficient knowledge of sheep to enable him to profitably breed his own ewes. In the future there would be more half-bred ewes kept and more fat lambs raised, and as a result the fertility of the soil would be increased.

TOASTS.

At the conclusion of the Conference delegates and visitors were entertained at supper, and several toasts, including "The Visitors," "The Chairman," (Mr. P. Manning), "The Secretary" (Mr. Fredk. Coleman), and "The Press," were honored.

CONFERENCE OF YORKE'S PENINSULA BRANCHES.

At the Kadina Town Hall, on April 17th, the Yorke's Peninsula Branches of the Agricultural Bureau, in conjunction with the Northern Yorke's Peninsula Field Trial Society, held their annual Conference.

The Minister of Agriculture (Hon. T. Pascoe, M.L.C.), the Principal of the Roseworthy Agricultural College (Professor A. J. Perkins), Poultry Expert (Mr. D. F. Laurie), Wool Instructor (Mr. Henshaw Jackson), Mr. J. Miller (Advisory Board), and Mr. H. J. Finnis represented the Department of Agriculture, and the following delegates attended on behalf of the Branches undermentioned:—Bute—Messrs. L. E. Simon, W. H. Sharman, S. Trengrove, E. W. Billis, W. Gardner; Kadina—Messrs. R. Truscott, F. R. Brinkworth, P. Roach, G. A. Weidenbach, J. N. Pedler, D. N. Martin, C. A. Wilton, J. Malcolm, R. Goodall, R. J. Rose, R. Correll; Paskeville—J. H. Bussenschutt, S. R. Price, T. H. Price, W. G. Drewitt, T. R. Brinkworth, J. P. Pontifex, H. F. Koch, T. M. Forbes; Moonta—Messrs. W. B. Stacey, J. Shields; Maitland—Messrs. C. Pitcher, H. G. Tossell, S. G. R. Smith; Port Broughton—Messrs. G. E. Pattingale, T. F. Pattingale, D. Allchurch, G. Routley; Arthurton—Mr. W. R. Stephenson; Pine Forest—Messrs. D. Carman, R. D. Goodridge, A. H. Hewett, S. T. Barr.

Morning Session.

The chair was occupied by Mr. J. Malcolm. The President of the Northern Yorke's Peninsula Field Trial Society (Mr. A. Goodall) extended a hearty welcome to the visiting delegates, and expressed the hope that the Conference would result in considerable practical good, not only to those who attended, but to the farming interests generally.

HINTS ON WHEAT.

A paper under this heading was read by Mr. S. Trengrove of the Bute Branch. A resume of this has already appeared on page 1059 of the April issue, under the title "Marketing Wheat."

Mr. Stephenson (Arthurton) thought there was insufficient encouragement given the farmer to make the best sample possible of his wheat. Agents, however, were not likely to pay full market prices offering for finest quality wheat for grain that contained bunt balls. At Port Broughton last year 3d. per bushel was deducted for wheat that was smutty.

Mr. A. Goodall (Paskeville) said the difficulty was that the competition between the buyers was so keen that they had to take inferior and dirty grain.

Mr. R. Correll (Kadina) said farmers were practically encouraged to market dirty samples of grain. Frequently the screens of the harvester were

prevented from fulfilling their purpose in order that the grain might not lose weight in having the rubbish taken from it. The quality of the wheat at present was equal to the standard of 50 years ago, but generally the sample was not so clean.

Professor Perkins mentioned that the best solution to the difficulty that had been suggested was to have two or three fixed standards in place of the f.a.q. South Australian wheat to-day was equal in quality to the wheat produced here formerly. Manitoban wheat was quoted at higher prices, for the reason that it was rare in the market. While South Australian wheats were very likely cleaner than those of Russia and southern Europe, there was plenty of room for improvement. They really gained nothing by selling rubbish in their grain. All they did was to injure the man who marketed a good sample.

RESOLUTION.

Mr. A. Goodall (Paskeville) moved and Mr. Correll seconded "That in the opinion of this Conference the present system of purchasing wheat is unsatisfactory and unfair to those who produce a good sample, and that the paper read by Mr. S. Trengrove be referred to the Annual Congress of Agricultural Bureau for discussion." Carried.

NOXIOUS WEEDS.

Mr. R. Correll (Kadina) read the following paper: "The increasing prevalence of noxious weeds and the disinclination shown by many landholders to exterminate them at the proper season of the year, unless repeated appeals are made, is causing considerable alarm amongst many careful agriculturists. There are several weeds under the Noxious Weeds Act which could be easily dealt with if attacked at the flowering stage. This particularly applies to weeds of the thistle variety. These do not thrive very well in various parts of the Peninsula or the northern portions of the State unless in watercourses or heavy and low-lying land. Landholders, and especially those who have large areas, should take action without repeated notices and threats of legal proceedings. Although corporations and district councils have large powers vested in them, the members of these bodies are averse to using these powers if they can by other means induce landholders to comply with the provisions of the Act. It has been suggested that the Act should be simplified. I think an amendment might be made in respect to giving notice, as the delay of a few days in a certain stage of the growth of the weeds would mean that the seeds would be shed, thus rendering the attempts at destroying them practically futile. Some have expressed the opinion that the police should be given the duty of seeing that the weeds are destroyed, but I do not think that anyone is more competent to do the work or could do it with less expense than the district council inspector, assisted by his council.

There are many weeds not gazetted as noxious which are a source of concern to the tiller of the soil. These include sheep-weed, stinkwort, and charlock. There is another weed I have noticed of late years which promises to become a great nuisance, and will spread very quickly if not kept in check. It is of the turnip variety. In many places it is taking possession of the land, and, if left to seed and become dry, it blows about in the wind for miles and scatters its seeds. It grows to a good height and has a bright yellow flower. Landholders should be loyal and see that they do not grow weeds which will prove harmful to their neighbors."

AUTUMN FALLOWING.

Mr. T. R. Brinkworth (Paskeville) contributed the following paper:—"I am desirous of bringing under the notice of the delegates some of the advantages of fallowing at this season of the year. All farmers are agreed that it is not profitable to have their horses in the stables well fed but not doing any work, which is often the case in this district during the months of March and April. For a number of years I have made it a practice to start a team fallowing about the first week in March. For the first year or two I used the plough with fair success, but found that a cultivator was a far better implement for autumn working. While the plough would, perhaps, cut better, it had a tendency to turn up the land in large lumps, and it was more difficult to get it worked down to a fine tilth later on. The cultivator best adapted for this work is one with the tines not more than 5in. apart. If a 5½in. share is put on it will cut at a shallow depth, and will go into almost any land with a pressure that will not damage the implement. It will loosen the soil ready for the first rains; the seeds of the weeds that otherwise would be lying on the top of the land will be buried at a shallow depth, and will get an early start, and thus give the farmer ample time to destroy them. The fallow will also have the benefit of all the early winter rains. Another great advantage is that the horses are better able to work and the days are longer in March and the early part of April than in June and July. If the weather is hot or disagreeable the horses and men can have an extra hour or more rest at midday and still cover a greater acreage per day than in June or July. By the time all the land intended for fallow has been cultivated it will be time for seeding. When seeding is finished I would recommend cross-working with the same implement the land already cultivated, but this time putting on a share 7in. wide, and working the land in as damp a condition as possible. The object, on this occasion, should not be solely to kill every weed, but to work the ground into a fine condition. After the land has been crossed with the cultivator, a set of good heavy harrows will pull out nearly all the weeds that have survived. Fallow thus worked will be much finer and will retain a great deal more moisture than land ploughed after seeding. A greater quantity of weeds will also have been killed, and there will be a chance of the development of another crop, which can be easily destroyed in the springtime.

Thus the danger of the much dreaded takeall will be lessened. The extra cost of working under this system is very little, as the horses, in most cases, would be idle in the stables during autumn. By conserving the early winter rains that fall during seedtime an insurance against a dry season is effected."

COMMENTS AND QUESTIONS.

Mr. A. Goodall paid a tribute to the careful and successful farming of the writer of the paper. The system of cultivating fallow advocated by Mr. Brinkworth had a beneficial effect, although it might not be suitable for heavy clay land which might become too stiff.

Mr. R. Correll strongly believed in the system. Last year he treated 100 acres in the manner recommended, and was very pleased with the results.

Mr. S. Trengrove desired to know the depth to which Mr. Brinkworth advocated working the land.

Mr. Brinkworth said the first working should be to a depth of about 3in., the next being just sufficiently deep to cut the weeds. Sandy land should not be cultivated at all. If they got on to ordinary land in this district just after a slight rain they would prevent drift.

Mr. J. Malcolm had secured a return of 28bush. to the acre from land which he had autumn fallowed, and only 16bush. from land not so treated.

Mr. W. R. Stephenson said the success of autumn fallowing depended on the nature of the soil. The only person who had tried it in his district had been very successful, but he did not think it would be of much use on some of his land on account of the mallee roots.

Mr. H. G. Tossell (Maitland) thought no uniform system could be laid down for the working of all soils, but the suggestions made in the paper would be of use to those farming in his district.

Afternoon Session.

WELCOME TO THE MINISTER.

Mr. T. Goodall welcomed the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), and in referring to the work of the Agricultural Bureau mentioned that it had been the greatest factor in agricultural education in South Australia during the past 25 years.

The Minister, in reply, referred to the excellent work which was being done by Professor Perkins at the Roseworthy Agricultural College. It was a great tribute to that institution that its students were so sought after by the other States. The dux of Roseworthy Agricultural College this year was from this district, and he congratulated them on presenting a student who had passed a higher examination than any other student who had attended the College.

There was only one centre in the State which held a Conference which he had not visited, and that was the West Coast. He was satisfied that the Bureau system was the finest thing of its kind in Australia. Victoria and New South Wales were looking with envious eyes on it, and the Under-Secretary for Agriculture in the latter State had said that what surprised him most in South Australia was that farmers would not only question the experts, but stand up and express their views and argue with them logically. Dr. Cameron, of Victoria, expressed a similar opinion, and stated that he was going to have the system initiated in Victoria. Their duty was to make the system more effective as an educational factor. The future of Australia depended very largely on the success of its primary producers, and they should do all they could to educate each other to take their part in the future development of the State. This they were doing by meeting together to exchange opinions. He thanked them for their hearty welcome.

Mr. J. Miller (Advisory Board) also expressed his pleasure at being present. That agricultural practice had greatly improved was very evident. He had never seen anything more encouraging than an area of fine lucerne, irrigated from underground supplies, which he had that morning visited in the Balaklava district. He felt that the Bureau had played an important part in the development of the high standard of farming to which they had attained in South Australia.

CLASSING FARMERS' CLIPS

The Wool Instructor (Mr. Henshaw Jackson) delivered an instructive address on the classing of farmers' woolclips. After detailing the requirements of the distinct woollen and worsted trades, he pointed out the direct advantages that accrued to the farmer who took the trouble to market his wool in a careful manner.

SHEEP.

Farmers were beginning to realise that if they only kept sheep to clean their fallows they were doing some good to their land; but these animals were deserving of better treatment than they got. The feeding of sheep had been tried in the Saddleworth district. One ton of hay would keep six sheep for one year in such a way that there would be no break in the growth of the wool. Farmers should experiment in the direction of ascertaining the nutritive values of different fodders. In New South Wales he was running 20 sheep on four acres, and since he came to this State he kept 10 sheep on half an acre. They were being fed on chaff, and he was convinced that 11b. of chaff per day was sufficient to keep a sheep in good condition. However, it was necessary to remember that sheep running over large areas would require more, in all probability, as the conditions were different.

CROSSBREDS.

Immediately they began looking for the sheep that was best for the farmer they got away from the Merino, which was particularly suited to what were

known as range conditions. Whilst it might not be possible for everyone to produce fat lambs, it was quite within their power to produce crossbred sheep. These would yield a good payable fleece as well as a good lamb. If they crossed the Merino with the Lincoln or Leicester, they should see that the cross was stuck to ; if another cross were introduced the whole equation from the wool point of view would be upset.

QUESTIONS.

In reply to a question, the Wool Instructor said his practice, when feeding sheep on chaff, was to steep the chaff in water containing a little salt over night. Frequently the chaff fermented and the sheep took this very readily.

POULTRY.

In an address dealing with "Some phases of the Poultry Industry," the Government Poultry Expert (Mr. D. F. Laurie) stated that, whilst the Peninsula comprised one of the best egg-producing districts in the State, at this end no progress was being made. At Minlaton there were a number of up-to-date plants, and this should be the case all over the Peninsula.

A great deal of trouble had been experienced with foxes, but this difficulty could easily be got over by the use of wire netting, and there was no need to get discouraged on this account.

At the egg-laying competition at Roseworthy there were 804 birds. The cost of feeding each bird for the 12 months had worked out at 5s. 7d. The average value of the return from each was 16s. 5d., an actual net return of 10s. 10d. per head. At the Kybybolite competition the leading pen laid 1,530 eggs, valued at £6 18s. 2d. The lowest return from a pen was 530 eggs, valued at £2 7s. 10d., a difference of £4 10s. 4d. in the value of the eggs laid.

Laying was a question of strain and not of breed. Certain breeds had long been well known as better layers than others, and from these had been developed certain strains or families capable of producing large numbers of eggs. The farmer who kept a decent class of fowl and weeded out the old hens should be able to secure a net annual return of from 6s. to 7s. per head. To enable the owner to distinguish the old hens, he advocated the use of the toe punch. As a general rule the farmer should keep hens for laying purposes. However, the breeding of table fowls would be found profitable where the holding was situated handy to market. Modern systems of housing would be found the best, and as a general rule the White Leghorn breed paid best.

HOUSING.

Wherever fowls were housed in old straw sheds or structures of a similar nature there would be difficulty with tick and other vermin. Houses of galvanised iron provided practically no harbor for these pests, and in these

the birds could be kept from becoming a nuisance in the garden or amongst the farm implements and machinery.

The principle of the system was to keep the hens busy scratching. On a loose earth floor, 6in. or 8in. of straw should be scattered, and into this a small handful of wheat for each bird should be thrown twice a day.

MARKETING EGGS.

Whilst it was not always possible for the farmer to get his eggs to market as promptly as he desired, it was possible for him to gather the eggs at least twice a day in the summer and once a day in winter. Especially was this the case where the hens were confined in proper yards. The infertile egg was certainly the best for market. He considered the annual loss to the State on account of irregular marketing of eggs to be about £50,000. This year, especially, was the loss extra heavy, as consignments from the country were turning out very badly. From September onwards during the year the bulk of the eggs went to the other States, and these people were not going to buy eggs that were not likely to turn out well. Although, at present, this State sent £150,000 worth of eggs to the markets of the other States annually, this was practically only the start of the industry.

OVERSEA SHIPMENTS.

The difficulty with the oversea markets was that there were not sufficient eggs to export. Previous shipments from this State were confined to eggs in the shell, but in the future they would be shipped in bulk. This would have an important bearing on the trade. A large number of eggs arrived in the city in a fresh condition, but not sufficiently fresh to render it advisable to ship them to New South Wales or Western Australia, especially if they had to wait a few days for the boat. If these were bulked immediately, they would be of good commercial value. Seventy-five per cent. of the eggs shipped to the West at the present time were in bulk, and it was his intention to try a small shipment of first class egg pulp to the London market. Throughout the world the price of eggs was rising. In 1895 the imports into London amounted to three and a quarter million pounds sterling. This year they were about eight and a half millions sterling. In addition, there was hope that Germany would open its doors to this trade, and in that country there was a market for ten and a half million pounds worth of eggs per year.

He did not advocate the adoption of poultry-farming solely, but recommended it in conjunction with other lines of agricultural practice.

DISCUSSION.

At the conclusion of the address a large number of questions were asked and answered by the lecturer. With regard to a statement made by one delegate that similar prices were paid by merchants for large or small eggs,

Mr. Laurie stated that first quality large eggs were paid for at rates equal to a penny per dozen higher than those for ordinary ungraded lines. The difficulty of breakages during transit could largely be overcome by using cardboard fillers in boxes holding 25 doz. eggs. All the packing that was necessary was two layers of woodwool.

Evening Session.

PICKLING WHEAT.

Professor Perkins (Principal of the Roseworthy Agricultural College) delivered an address as follows :—

First, why do we pickle wheat at all ? On this point there can be no two opinions. We pickle our seed wheat with a view to protecting our crops from “bunt” or “stinking smut.” This, as you know well, is a parasitic disease, capable of doing immense damage to crops unless special precautions are taken to circumvent it. In Russia, where agricultural practice is not all that it might be, it is estimated that in certain seasons as much as two-thirds of the wheat crop is destroyed by “bunt.”

Before dealing with the usual treatment of the disease, a few words on the disease itself will not be out of place. We can all detect it in the field when the grain is ripe. The diseased ears, instead of bending over under the weight of the ripe corn, stand up more or less erectly ; and the floral envelopes, or chaff, of these ears are more widely opened than those of sound ears. The diseased ear has a more or less ruffled appearance. And finally, the grains themselves that are full of an evil-smelling blackish-brown powder are rounder and shorter than normal grain, and generally of a greyish-brown color ; these are the bunt balls.

THE BUNT SPORES.

This brown powder that does not burst from the grain until pressure has been brought to bear upon the grain, represents all that remains of a parasitic fungus that has grown up within the tissues of the plant from the earliest stages of its growth. It is actually impalpable ; its individual elements being microscopic and invisible to the naked eye. These minute specks are the spores of the fungus, or what corresponds to the seed of the more highly organised plants. Each grain, or bunt ball, contains thousands of them ; and a diseased wheatfield produces them in millions of millions ; and each individual spore is a source of danger to any germinating wheat plant with which it may be brought in contact

It is important that we should realise how a healthy plant becomes affected by this disease. These minute spores may be carried into the field on the seed wheat, or else they are already present in the ground, carried there by the wind, or brought there in manure that may have been used as a dressing.

When weather conditions are suitable, *i.e.*, on the arrival of the autumn rains, these spores set about germinating just in the same way as the seeds of weeds and the seed of the wheat. The fungus is not compelled to find a host plant as soon as it has germinated. It may live more or less well in the soil moisture if the ground has been dressed with farmyard manure; or if the droppings of depasturing live stock are fairly abundant. No doubt thousands of these spores germinate in the soil without ever finding access to a wheat plant, and pass away with their mission in life unaccomplished, and without having done any harm. Some, however, in germinating, will come in contact with a recently germinated wheat plant; they then set about piercing the soft tissues of the young plant just at the base of the stem, which they penetrate. It should be noticed that as the sheath of the plant thickens with age they are unable to reach the stem, and unable, therefore, to get a footing in the plant. Unless wheat plants are attacked a few days after germination they are quite safe from the bunt fungus.

GROWTH OF THE PARASITE.

When the fungus has succeeded in gaining access in this manner to the wheat plant, its threadlike growth—like the spawn of the mushroom, only very much finer—creeps between the cells of the plant, drawing its nutriment from them and growing up with the plant. At this stage the wheat plants do not appear to suffer any inconvenience from this parasitism; indeed, if anything, diseased plants would appear, as a rule, to make stronger growth and to be a darker green in color than healthy plants. Throughout the growing period of the wheat plant the thread-like growth of the parasite may be traced within its tissues. When, however, the wheat plant begins to attain to its full size the parasite begins to concentrate itself in the upper portion and practically disappears from the lower portion of the straw. That is why a crop that has been fed down or cut down late in the season, is often free from bunt, whilst other portions of the crop not so treated may be very badly affected by the disease.

In rough summary, such is the life history of the parasite against the incursions of which we pickle our seed wheat. It may be added here that the life histories of the loose smut of wheat, the smuts of barley, oats, &c., are all very similar.

INFECTION OF THE SEED.

In the great majority of cases, therefore, infection spreads to a new field from the use of bunt-infested seed, *i.e.*, seed obtained from a bunt-infested field of the preceding year. The bunt balls are crushed in the harvesting operations, and millions of spores are set free to contaminate the sound grain. Although to our senses the grain of wheat is a comparatively smooth body, it is very far from being so to these microscopic spores; indeed, it offers numerous depressions and asperities in which the spores may lose themselves,

or to which they may cling until such time as they are awakened to active life by the autumn rains.

We cannot, however, regard seed as the sole source of infection, particularly since the complete harvesters have come into general use. And in this connection it is not the field in which harvesting is taking place that is to be considered chiefly, since in the following year it will either be grazed or fallowed, either of which practice must lead to the destruction of the bunt spores that may have been sown broadcast. The same cannot, however, be said of the neighboring fields that happen to be lying fallow; to these the bunt spores will be conveyed by the wind, much to the hurt of succeeding years' crops.

In the same way a cocky chaff heap from a stripper will prove a source of danger since, besides the spores of the disease, it will provide the organic matter that will maintain the latter alive in the absence of wheat plants upon which it can prey.

In any case, if a second wheat crop is taken, as is sometimes the case, there is always danger of bunt if the latter happen to have been present in the preceding year.

Finally, if farmyard manure is availed of, to which the cavings and waste of the wheat crop have been carted, there is always danger of contaminating the field for succeeding wheat crops. On the whole, however, the chief source of contamination is, as has already been stated, contaminated seed. This contaminated seed may be rendered clean by special treatment, which we term "pickling."

PICKLING.

Seed wheat was pickled long before anything was known as to the exact nature of "bunt." The first substance to be used for this purpose was lime, to which a little common salt was usually added to render it more adhesive. This pickle was in use as early as the end of the 18th century. Later on sulphate of soda was recommended. Towards the beginning of the 19th century, when the fungus nature of bunt began to be realised, copper sulphate came to be recommended on account of its well-known fungicide properties. At first, objections were made to it on account of its poisonous characters, which it was feared would be transmitted in the wheat. In the end, however, it triumphed, and is to-day the most widely used of all pickles. It is true that within recent years we have been recommended formalin, carbolic acid mixtures, &c. However, I fail to see that any substitute is needed for bluestone. It is cheap, easily handled, absolutely effective if properly applied, and any adulterations of it can easily be detected.

METHODS OF PICKLING WITH BLUESTONE.

Opinions differ as to the best way to pickle wheat with bluestone. I hold rather strong opinions on this point myself, and propose, therefore, dealing

with it thoroughly. It must be evident that, however great the merit of the pickle, unless it is applied in the right way we cannot anticipate from the treatment anything like consistent results.

Let us, therefore, in the first place, endeavor to form a clear idea of what we should aim at when we set about pickling seed wheat. We have, in the first place, seed which we suspect of being more or less soiled with the spores of bunt. In extreme cases the grain may be more or less speckled in black; generally, however, the individual bunt spores will not be visible to the naked eye. The bluestone solution, or the pickle, acts as a poison towards these spores, that is to say, it has been shown very definitely that if one of these spores is brought in contact with the merest trace of copper sulphate it forthwith loses its power of germination, and is therefore, to all intents and purposes, harmless. We are not in a position to know in ordinary circumstances exactly where these spores happen to be on the grain of wheat; they may be anywhere on its surface; perhaps hidden in the depths of the central groove; perhaps caught in the fine terminal bristles of the grain; perhaps, again, merely adhering to the rough surface of the grain. Whatever may be the case, if the pickle is to be effective, it must thoroughly wet every portion of the external coating of the grain to which the spores of bunt may gain access.

It has occurred to many that simply to dip the grain into the pickle must bring about the results we are seeking. Acting on this principle, many are content to dip a bag of wheat into some bluestone pickle, leave it there a few minutes, and then withdraw it and allow it to drain. I venture to say that the result of such a practice is that probably not more than two-thirds of the exposed surface of the immersed grain will have been thoroughly wetted by the pickle. In the first place we must realise that between the grains of wheat a bag imprisons a vast amount of air. This air clings to the grains after the latter have been immersed in the pickle, and wherever it attaches itself it successfully prevents the grain becoming thoroughly wet. To realise this it is sufficient to drop a few detached grains into a glass of water. In this case the air is not mechanically held by the piled up grain; nevertheless, it will be seen that individual grains are covered up with a silvery lining in parts at all events. This is nothing else than a protecting coat of air which cannot be displaced unless the grain be vigorously stirred up. As a rule, it will be found that it is the terminal bristles and the deep central groove that are protected in this way. Apart altogether, therefore, from the piled condition of the grain, its general surface is such that it does not readily become wetted by liquids. We must not forget that every portion of the grain that escapes wetting in this manner is liable to shelter spores of bunt.

It is because of this that, in my view, the mere dipping of a bag into a pickle, however good, is not a really dependable preventive of bunt. Of course, it might be rendered effective if the grain were to be handled in small quantities

and vigorously stirred round for some time. In ordinary practice, however, this can hardly be done.

In former times, when dipping was first recommended, it was directed that the immersion of the bag should extend over 12 hours in one-half per cent. solution of copper sulphate. This cumbersome method is, I believe, still in vogue in some portions of Germany; but besides time and material it presents the disadvantage of injuriously affecting the germinating power of the grain.

FLOOR PICKLING.

But if dipping is not effective, what other method can be suggested? Personally, I favor the old floor pickling method. At Roseworthy we use none other, and we have never had to complain of bunt in our crops to any great degree; and in my view this is how the work should be carried out. Select a wood floor for the purpose; a cement floor is objectionable in that it has a tendency to decompose the bluestone and, therefore, to weaken the pickle. According to the floor space available one or more bags may be emptied out. A 1 per cent. solution of bluestone, *i.e.*, 1lb. of bluestone to 10galls. of water should be made up in a wood tub, not in a kerosine tin again for fear of weakening the solution. The bluestone solution should be poured carefully over the heap of grain until the excess begins to run away from the heap. This will take up between 2½galls. and 3galls. of pickle to the bag of grain. In the meanwhile the grain should be shovelled over vigorously with a wood shovel until every grain is judged to be well covered with the pickle. The shovelling and the rubbing of grain against grain helps to drive away the air adhering thereto. Iron shovels should be avoided for the reasons already given. The grain should either be put into new bags or into old bags that have been dipped in the bluestone pickle. There is no doubt that if the work is carried out thoroughly and conscientiously all bunt spores present will be destroyed.

REINFECTION.

There is, however, the danger of what is known as "reinfection." This takes place in the ground from spores that may be present there. It is in this way chiefly that infection of loose smut takes place. This smut ripens and sheds its spores long before the grain of wheat is ripe; the grain, therefore, is comparatively free from it. It is certain that ordinary bluestone pickle cannot have a permanently protecting influence on the grain, particularly when placed in moist ground, which will gradually dissolve it. Therefore, even pickled seed is liable to infection if sown in bunt-infested soil. To obviate in some way this difficulty it has been proposed that after pickling the grain should be sprinkled over with recently slacked lime and then shovelled over again. The effect of the lime is to decompose the copper sulphate and leave behind on the grain copper hydrate, which is more adhesive and less readily soluble in the soil moisture. The practice is good and may

be recommended so long as it does not interfere with the free running of the grain in the drill.

STRENGTH OF THE PICKLE.

I have said that a 1 per cent. solution of bluestone, *i.e.*, 1lb. in 10galls. of water, is all that is required. You will occasionally see heavier pickling recommended—1½lbs., 2lbs., and even 3lbs., and 4lbs., to the 10galls. In my view this is a serious mistake. There is not the slightest need to raise the strength of the solution above 1 per cent.; even weaker solution would suffice to destroy the spores of the disease. The slightest trace of copper sulphate will destroy the germinating powers of the spores. It is of far greater importance not to skimp the pickle rather than to strengthen it. The great objection to strong solutions of bluestone is that they are apt to impair the powers of germination of the wheat grain. Because the grain happens to be very much contaminated by bunt there is absolutely no reason why the strength of the pickle should be raised. The seed will need to be pickled all the more carefully, using plenty of the 1 per cent. solution and shovelling over long and diligently.

OBJECTIONS TO BLUESTONE.

Substitutes for bluestone are constantly being brought forward. In Yorke's Peninsula, at all events, they should find no supporters. There is nothing serious that can be brought against bluestone that I am aware of, providing always it be judiciously handled. The worst I know of it is that it puts back germination by two or three days, not a very serious objection.

As a matter of general practice, I see no need to pickle wheat that is sown purely for hay. The crop is cut down long before the bunt fungus comes to maturity. Nor do I think it wise to pickle even grain crops that are sown under dry conditions of soil. As a rule, the soil, although too dry to induce germination in the wheat, will bring about the germination of the bunt spores, the fungus subsequently dying out without being able to do any damage. If the seed is pickled there is danger of malting.

PICKLING OF BARLEY AND OATS.

In ordinary practice I recommend pickling both barley and oats in the same way as wheat, although I recognise that this is far less satisfactory with these two cereals. Both oats and barley are specially affected by a kind of smut quite distinct from that affecting wheat, and which is not susceptible of transmission from one to the other.

These smuts destroy the ears of both barley and oats at about the time these cereals come into bloom, the smut spores being scattered about the field long before the grain is mature. You will know, too, that the grain of both oats and barley, apart from the exceptional skinless varieties, are covered by an outer husk which is absent in wheat. This husk is portion of the chaff

which adheres to the grain when it ripens. When the smut spores of barley and oats are floating about in the field the chaff or husk has not yet begun to cling to the grain, and between them is ample space for spores to penetrate, and in this way they are finally enclosed in the grains of barley or oats as they mature. It follows, therefore, that no amount of external pickling can reach the spores that are, so to speak, within the grains themselves.

To get over this difficulty the hot water treatment was suggested by Jensen. It is, however, far too difficult of application and too delicate ever to come into general use. The difficulty is that the temperature which will destroy the spores is very dangerously close to the temperature which will destroy the barley or oat grain. In order to destroy all spores the grain must be immersed in water at a temperature of 129 degrees for about five minutes. On the other hand, barley appears to lose its vitality at a temperature of 132 degrees. Copper sulphate is, therefore, still recommended for oats and barley, recognising that it is effective only to a limited degree. In a general way it is better to secure seed known to have been free from smut in the preceding year.

SMUT AND BUNT RESISTANT VARIETIES.

We sometimes see references to bunt and smut resistant varieties. I know of no varieties that are quite satisfactory in this direction; nor, as a matter of fact, do I see any particular need for them. Pickling is a very simple, inexpensive, and effective practice which gives all that we require.

VISITORS ENTERTAINED.

The Minister of Agriculture, representatives of the department and the Advisory Board, and presidents of visiting Branches were entertained at dinner as the guests of the Northern Yorke's Peninsula Field Trial Society. The following toast list was honored: "The King," "The Ministry," "Advisory Board of Agriculture," and "N. Y. P. Field Trial and Show Society."

MATTERS OF AGRICULTURAL INTEREST.

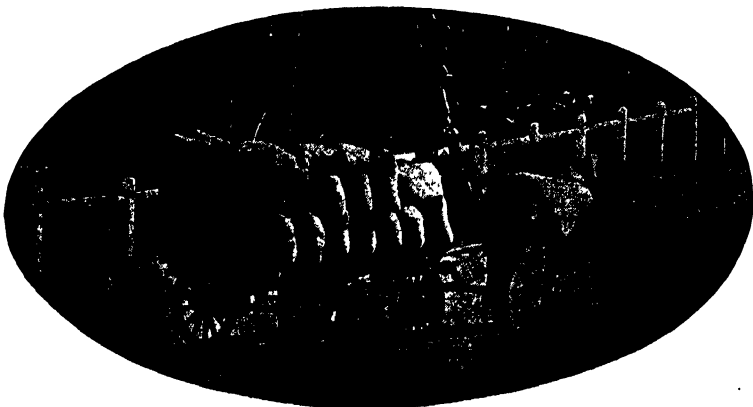
The Minister of Agriculture (Hon. T. Pascoe, M.L.C.) drew attention to some important matters affecting the agricultural interests of the State. With reference to the Agricultural Bureau, he said the present Conference was the first held since the 25-year mark of the establishment of agricultural bureaus had been passed, and he was pleased to say that the various Branches were going stronger to-day than at any period during the history of the movement. Mr. Nicholls, the Secretary of the Advisory Board, was making arrangements for the next Congress to be a celebration of the completion of 25 years of Bureau work, and he thought that it would be a great success. The vigorous manner in which the bureau work was being carried on spoke volumes for the farmers of South Australia. They showed a desire to educate themselves on scientific lines for the wellbeing and general advancement of the industry.

DEPARTMENTAL ADMINISTRATION.

He had determined to effect a number of changes in the administration of the department. In the past there had been too many experimental farms spread over too large an area to ensure proper oversight and control. He was convinced that experiments carried out by leading farmers in various districts were taken more notice of in the centres in which they were carried out than those conducted under Government control. It was impossible for the Government to establish a farm in each district where there was a variation of soil and weather conditions, and local experiments were looked upon as the most suitable solution of the difficulties presented. At Saddleworth, for the past nine years, experiments had been conducted by Mr. Coleman in the matter of manuring, and the results obtained were most interesting and conclusive. Mr. Pengelley, at Aldinga, had been conducting experiments in the direction of providing fodder crops for stock and sheep. Therefore, as had already been reported, it was decided to close a number of the farms.*

Continuing, he said there had been a certain amount of criticism levelled at the experimental farms because they did not pay, but the public must remember that if only 10 per cent. of their experiments were payable propositions the results warranted the expenditure, while it must also be credited to the account of the experimental farms that some of the failures had perhaps saved other farmers hundreds of pounds. The Turretfield farm on 400 acres of crop next year would be carrying 200 different varieties of wheat, and wheat grown under those conditions had to be slowly and carefully harvested to give correctly the results of the different experiments as against the average farmer turning his machinery into, say, a hundred-acre paddock. It was not wise to be too severe on the returns from those farms, as the lessons taught and the experience gained were of more immediate importance.

[*Detailed particulars were given in the Minister's opening address at the Conference of Northern Branches. See April issue, page 1021.—Ed.]



ANALYSES OF FERTILISERS.

The following table gives the results of the analyses made by the Government Analyst (Mr. W. A. Hargreaves, M.A.) of further samples of fertilisers taken by the inspectors under the Fertilisers Act since the beginning of the year 1913:—

Name.	Phosphate.				Acid Soluble.		Nitrogen.		Potash.	
	Water Soluble.		Citrate Soluble.		Result of Analysis.		Result of Analysis.		Result of Analysis.	
	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	%	%	%	%	%	%
Adel. Chem. & Fer. Co., Ltd.—										
Bone dust	—	—	—	—	43.00	45.81	4.00	3.25	—	—
Hay manure	37.16	30.00	3.03	2.00	3.00	44.30	0.65	0.50	—	—
Bone super.	21.28	15.00	13.08	15.00	4.57	38.93	1.81	1.60	—	—
Guano super.	35.75	27.00	1.92	3.30	6.00	39.82	—	—	—	—
* S.A. super.	33.92	30.00	—	—	—	—	—	—	—	—
Mineral super.	34.65	36.00	—	—	—	—	—	—	—	—
† S.A. super.	37.68	30.00	—	—	—	—	—	—	—	—
Anders & Son—Victor bonedust ..	—	—	—	—	43.40	—	4.50	3.00	—	—
Crompton & Son—	—	—	—	—	—	—	—	—	—	—
Thomas phosphate ex <i>Schwaben</i>	—	—	17.00	—	20.00	37.80	—	—	—	—
Pure bonedust	—	—	—	—	44.67	41.21	3.87	3.8	—	—
Hackett, E. & W.—	—	—	—	—	—	—	—	—	—	—
Peruvian guano ex <i>Palma</i>	18.76	18.00	4.09	—	2.00	—	5.01	5.00	1.69	2.00
Hasell, A. H.—	—	—	—	—	7.50	37.30	—	—	—	—
Thomas phosphate ex <i>Westfalen</i>	—	—	—	30.50	—	—	—	—	—	—
Heinrich Bros. (Agents)—	—	—	—	—	—	—	—	—	—	—
Wallaroo stan. super.	38.30	36.00	—	—	—	—	—	—	—	—
Wallaroo phos. guano	26.73	27.00	7.45	3.00	6.00	—	—	—	—	—
Crompton's bonedust	—	—	—	—	44.67	42.77	4.13	3.80	—	—
Mt. Lyell Min. & Ry. Co., Ltd.—	—	—	—	—	—	—	—	—	—	—
Standard super.	35.49	36.00	—	—	—	—	—	—	—	—
" (Bell & Co., Agents)	—	—	—	—	—	—	—	—	—	—
ex <i>Kwinana</i> ..	—	—	—	—	—	—	—	—	—	—
Wallaroo Phos. Co.—	37.60	36.00	—	—	—	—	—	—	—	—
Standard super.	—	—	—	—	—	—	—	—	—	—
Wills & Co., Geo.—	41.87	36.00	—	—	—	—	—	—	—	—
Thomas phosphate ex <i>Eastings</i>	—	—	—	25.00	—	35.10	—	—	—	—
Elder, Smith, & Co., Ltd.—	—	—	—	—	—	—	—	—	—	—
United alkali super. ex <i>Mediere</i>	—	—	—	—	—	—	—	—	—	—
Pitt & James, Ltd.—	36.50	36.00	—	—	—	—	—	—	—	—
Sulphate of potash ex <i>Colmar</i> ..	—	—	—	—	—	—	—	—	53.28	52.00

* In April *Journal*, Adol. Chem. & Fert. Co.'s S.A. super. was shown as 33.00 guaranteed water soluble phosphate. This was an error, and should be 30.00 guaranteed water soluble phosphate as above quoted.

† This sample was taken from bags branded "S.A. Super.," but the manufacturers claim that the fertiliser should have been "Mineral Super."

GEO. QUINN, Inspector of Fertilisers.

AGRICULTURAL BUREAU REPORTS.

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Crystal Brook	1175	—	—	Minlaton	1186	16	19
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Dawson	*	—	—	Monarto South	1193	17	—
Dingabledinga	*	9	13	Monteith	1193	—	—
Dowlingville	*	—	—	Moonta	†	10	—
Elbow Hill	1188	—	—	Moorlands	*	—	—
Forest Range	1201-2	15	19	Morchard	*	—	—
Forster	1192	—	—	Morgan	1194	17	—
Frances	*	16	13	Morphett Vale	1203	—	—
Freeling	*	—	—	Mount Barker	*	14	18
Friedrichswalde	*	—	—	Mount Bryan	*	17	14
Gawler River	1181	—	—	Mount Bryan East ..	*	3	7
Georgetown	*	17	14	Mount Gambier	1206	10	—
Geranium	*	31	28	Mount Pleasant	1204	9	13
Gladstone	*	—	—	Mount Remarkable ..	1171	14	18
Glencoe	1205	—	—	Mundoora	*	—	—
Goode	†	—	—	Nantawarra	*	14	18
Greenock	*	—	—	Naracoorte	1207	10	14
Green Patch	†	19	—	Narridy	*	—	—
Gumeracha	*	19	16	Narrung	*	—	—

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Northfield	*	6	3	Sutherlanda	1197	17	14
Orroroo	†	17	14	Tatiara	*	3	7
Parilla Well	*	—	—	Tintinara	1197	—	—
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Paskeville	1186	15	19	Uraidla and Summert'n	1204	6	2
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Penong	*	10	14	Waikerie	1198	19	16
Petina	1189	—	—	Warcovie	*	—	—
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Port Broughton	1176	16	13	White-Yarcowie	1178	—	—
Port Elliot	†	17	21	Wilkawatt	1198	17	—
Port Germein	†	—	—	Willowie	1172	9	6
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Redhill	1177	20	17	Wirrabara	*	—	—
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Saddleworth	1183	16	20	Yabmana	*	—	—
Salisbury	†	6	3	Yadnarie	*	17	14
Shannon	*	—	—	Yallunda	*	—	—
Sherlock	*	—	—	Yongala Vale	*	17	14
Spalding	†	16	20	Yorketown	1187	10	14
Stockport	*	—	—				

*No report received during the month of April.

† Formal report only received.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—
June 11th and July 9th.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Amyton, April 17.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. T. O'Donoghue (chair), W. Gum, T. Griffin, T. Ward, A. J. Phillis, M. Corcoran, H. K. Gum, J. J. Cormack, S. Thomas, A. Crisp (Hon. Sec.), and three visitors.

SMUT OR BUNT.—The following paper on this subject was read by Mr. T. Griffin:—“In view of the prevalence of smut in the crops in this district during the past season, it occurred to me that a few notes on this subject might not be out of place at this juncture. Stinking smut or bunt is caused by a fungus which reproduces itself by means of spores. It attacks the wheat plant just after the time germination takes place, eats its way into the plant, grows with it, and eventually produces a great number of spores which form the ‘bunt balls’ found in infected heads. The problem for the sower then is to prevent the fungus attacking the plant when it is germinating, and this is most effectively done by pickling. It is necessary, whatever method of pickling is adopted, that every grain should be completely covered with the mixture, thus killing all spores that may be adhering to the grain. When this is done the grain will be clean and produce a clean crop, unless, of course, reinfection takes place after the seed has been pickled. Reinfection is commonly caused by the pickled seed being transferred to smutty bags, or bunt balls may be broken in the drill and distributed over the seed whilst it is being sown. Various methods of pickling are adopted, bluestone, formalin, fungisine, and proprietary lines being used. During last season I used 11b. of bluestone to three bags of wheat. One bag of wheat was placed on a board floor and one-third of a pound of bluestone, mixed with a gallon of water, was poured over it, the wheat being shovelled over three times. The results were very satisfactory.” In the discussion which followed, members thought the pickle recommended by the writer was rather weak. Some preferred to dip the wheat in a solution of bluestone, as when mixing on the floor, frequently bunt balls were not broken and the spores were not destroyed.

Coomooroo, March 31.

(Average annual rainfall, 12 in.)

PRESENT.—Messrs. E. Berryman (chair), J. Brown, E. Brice, A. Robertson, H. Fisher, F. Gregory, R. Brice, R. W. Robertson, and M. Robertson (Hon. Sec.).

WHEAT MOST SUITABLE FOR DISTRICT.—A lengthy discussion on this subject was initiated by Mr. J. Brown, who expressed the view that Federation was the most reliable wheat for this district. Steinwedel also was very good, and he warned members against sowing the whole of their cropping area with one variety. Mr. R. Brice thought that while Federation did well on fallowed land, it suffered considerably from the effects of wild oats and weeds when sown on stubble. Yandilla King was a good variety, but was

rather tough to reap. Mr. Fisher thought Yandilla King a very good hay wheat; and while Cumberland also was good for this purpose, it had not yielded heavy grain returns in this district. Mr. E. Brice had been successful with Carmichael's Eclipse on dirty land as it grew quickly and yielded well. Some members favored Red Gamma.

Coomooroo, April 19.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. Berryman (chair), Lillecrapp, Pitchers, Gregory, E. Brice, R. Brice Cooke, R. W. Robertson, C. Phillis, W. M. Robertson (Hon. Sec.), and one visitor.

SHEEP ON THE FARM.—In a paper on this subject Mr. G. B. Lillecrapp stated that it was advisable for farmers to keep sheep. They should be put on to the fallow immediately weeds appeared, and kept on until the cultivator was put over the land. They required very little attention, and would be found to do well where other stock would practically starve. The droppings from these animals were extremely rich. Where the area was sufficiently large it would pay to keep a line of breeding ewes when, if the season turned out well, fat lambs would be available for market. Although the Shropshire or Dorset Horn ram would produce lambs more suitable for export and earlier of maturity, it was advisable in this district to confine attention to the pure Merino, as in the event of the season turning out somewhat adverse a better yield of wool would be secured. In discussing the subject, Mr. Pitcher said that not only was there the value of the wool to be taken into consideration, but a supply of fresh mutton on the farm was of considerable value. Mr. R. Brice thought the weather conditions of this district were too unreliable for fat lamb raising. Mr. Berryman, however, considered that fat lambs could be raised. He would not keep sheep during the summer, but would save the summer feed for wethers, which he would purchase in March and sell off shears in October.

Craddock, April 19.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. McAuley (chair), Patterson, Graham, Clarke, Glasson, Gillick, Solly, Hilder, Finch, M. Neylon, P. Neylon, Adams, W. Lindo, Smyth (Hon. Sec.), and nine visitors.

REGISTRATION OF STALLIONS.—A discussion on this subject was initiated by the Chairman, who pointed out the necessity for careful consideration being given the matter before definite action was decided on. Mr. T. Hilder and Mr. Graham agreed that the dry Northern districts were better served by what were known as the mongrel horses. As the majority of horses were bred in Queensland and the Northern Territory it would be difficult to enforce the proposed regulations, as the stallions were running wild in many places. Mr. Smyth thought that in view of the large areas of land that were to be opened up in the near future the proposed regulations would result in a scarcity of horseflesh. On the subject being put to the vote the majority of members favored the proposal.

TACKLING FOR COLT-BREAKING.—Mr. Solly gave an interesting demonstration with a tackling which enabled a man singlehanded to throw a colt. The beast was held in thorough check, and prevented from kicking either when in the saddle or when in harness.

Hawker, April 22

(Average annual rainfall, 11½in.)

PRESENT.—Messrs. G. H. Wright (chair), J. Palin, W. J. Pyman, B. Mansom, A. H. Rhymer, G. Moller, C. W. Pumpa, and J. Smith (Hon. Sec.).

THE BRANCH'S WORK.—The hon. secretary read a paper in which he dealt with the work accomplished by the Branch during its existence, and drew attention for the necessity for more enthusiasm on the part of members. After considerable discussion it was decided that those present should undertake to provide papers for future meetings, and a special effort should be made to increase the interest in the work of the Branch.

Mount Remarkable, April 16.

(Average annual rainfall, 21in.)

PRESENT.—Messrs. N. S. Giles (chair), W. Oldland, F. B. Smith, J. H. Goddard, J. McIntosh, E. Mayne, L. A. Bauer, E. B. Andrews, E. M. Wellington, M. G. Giles, and H. H. Davis (Hon. Sec.).

REGISTRATION OF STALLIONS.—In a paper on this subject Mr. J. McIntosh expressed the opinion that horsebreeders in Australia would continue to improve the strains by introducing sires from England. He thought that owners of all stallions, whether for public or private use, should be required to pay a registration fee of about £1 for each animal when it reached the age of 2 years. The horse should also be subjected to an examination as to its soundness and conformation. The owner could then make application to the Agricultural Bureau in the district in which he intended to travel for permission to ply for hire. Each State should formulate its own laws on the subject. Mr. M. G. Giles also read a paper as follows:—‘As the law now stands an owner who wishes to secure a certificate of soundness for his stallion takes it to one of the Government veterinary surgeons who examines it. If, in his opinion, the animal is not sound in every respect, a certificate is refused. The owner may subsequently try to get another veterinary surgeon to pass the stallion, I believe, but has to inform him that a certificate was previously refused. Failing to supply the information makes the owner liable to a substantial fine, and it is extremely unlikely that the second Government officer will give a certificate if he knows that it has been previously refused. With the exception that I consider the owner should have the right of appeal to an independent expert, I believe the existing law is a good one and all that is at present required. In reference to the proposed request for a compulsory registration Act it does not seem absolutely clear how far the urgers of it wish to go; but, personally, I cannot see that at present further legislation is required. If it is only proposed to make it compulsory for travelling stallions to be registered the benefit gained in improving our stock will probably be counteracted by a number of the smaller breeders following the example of the larger ones, and keeping stallions of their own to serve their mares. It seems almost certain that if the number of stallions travelling in a district is reduced, and their owners have to pay substantial registration fees, two results will follow. In the first place, supposing the owners of mares still try to breed on the present scale, the percentage of foals will be considerably less; and in the second place, owing to decreased competition and the necessity of making up the registration fee, the charges for service will be substantially increased. Both these will tend to make breeding much more expensive, with the result that it will not pay unless horses are to be kept at a very high price, which is not a desirable thing from a national standpoint. The owner of a few mares could not afford to pay a very high price for a stallion, therefore he would probably save the most promising of his own colts for the purpose, or else give up breeding altogether. The first course would tend toward degeneracy in our horse stock, instead of improving it, and the second would again tend to raise the price of horse-flesh above a desirable figure. That is assuming that it is not intended to bring any but stallions available for hire under the Act. Personally, I think the intention is to prohibit the existence of a stallion unless it is registered. That is the only way in which it will have the desired effect of improving our horse stock, and, in my opinion, the price paid for the improvement will be far too great for the benefit derived. And furthermore, it is not possible to put it into execution entirely until all the interior of this Continent is fairly closely settled. As has been pointed out by members of this Branch it will be impossible to put the Act into operation in our outside country, and yet it is manifestly unfair that the large breeder—who already has the advantage—should be given such a further help in squashing the small breeder out of existence. When such a time arrives that our horse stock is manifestly deteriorating and becoming the reverse of a credit to the country, I suppose we shall all feel that it is necessary to do something drastic to improve a decaying race; but until that time I cannot but object to legislation which would very seriously hamper the industry. And when registration does become necessary—if it ever does—for the sake of the breed, should it not, in common fairness to all, and most particularly to the offspring, apply to mares as well as stallions?’

Wepowie, April 15.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. C. Halliday (chair), C. Knauchrasc, G. Rooke, J. E. and C. Pearce, J. Crocker, J. Orrock, T. F. Orrock (Hon. Sec.), and two visitors.

SEEDING.—In a paper on this subject Mr. G. Roocke said the first essential in connection with seeding operations was to see that all the implements were in proper order. Ground that was at all rough, especially if it were light, would be found to benefit considerably by rolling. For dry seeding he would put the grain in as shallow as possible; but where the ground was moist he would drill fairly deeply. It was advisable to pickle seed with a solution of $\frac{1}{2}$ lb. of bluestone and 2 galls. of water; this quantity would be sufficient for 4 bush. Where the seed was very badly affected with smut, $\frac{1}{2}$ lb. of table salt should be added to the solution. While it was best to grade all wheat used for seed, graders were expensive, and in the absence of one the farmer could well use the winnower with the drake screen. Late varieties of wheat should be sown before early varieties. Gluyas Early and Viking had been found very satisfactory in the district, and Federation had also been a success, although it was unsatisfactory for dry sowing. About 60 lbs. of super. and a bushel of seed should be used to the acre on light land, but heavier soils could well be dressed with larger quantities of manure.

Willowie, April 15.

PRESENT.—Messrs. T. Hawke (chair), D. McCallum, J. Stone, L. and J. H. McCallum, B. E. Schmidt, S. C. Greig, A. W. Howard, F. Richter, L. Hughes, and W. P. Foulis (Hon. Sec.).

REGISTRATION OF STALLIONS.—Members thought that the suggested scheme for the registration of stallions would be unworkable in Australia, as in the back stations, where breeding was gone in for on a large scale, stallions were allowed to run loose. The result of the proposal would be to increase the cost of service. Members decided not to support the idea.

SEED WHEAT.—Mr. J. H. McCallum read a paper on this subject. Farmers were advised to keep both early and late varieties of wheat for seed. When very early rains were experienced they could sow late varieties. This practice had yielded greater returns in his case than were secured from earlier varieties sown later. Marshall's No. 3 and Yandilla King were good for this purpose. They made little growth before winter but came away well in the spring, producing good straw, carrying large heads. Three years ago when between 2 in. and 3 in. of rain fell during the first week in March he sowed 150 acres with Marshall's No. 3 immediately after the fall. The horses were running on the crop through the winter until August, and the return was equal to that from any other wheat on the farm. For April sowing he recommended such varieties as Federation or Caltowie Knobby. The latter was better for dry sowing. For late season sowing Viking and Gluyas could be recommended, but as the latter went down badly a limited area only should be put in. In discussing the subject, Mr. D. McCallum said seed selection should be carried out in the district in which the grain was to be sown. He had had several varieties of wheat sent up from the city and sowed them alongside Purple Straw which he had grown on the place for several seasons. The season was not favorable, and the local grown seed turned out much better than the others. Leak's Rust Proof was a bad yielder. Whilst Gluyas had a tendency to go down badly it was the best wheat for dry conditions. Federation had not been a success. Caltowie Knobby was better; it carried a good deal of chaff, but was a heavy yielder. Steinwedel had proved a failure on parts of the Willowie Plains. Mr. Hughes had found that Gluyas stood up fairly well on sandy ground, but it went down badly on clay land. Mr. J. Stone said the straw of Gluyas kept green after the grain began to form, consequently it was a good wheat for hay. Mr. T. McCallum had found Marshall's No. 3 a good variety for early sowing. It suited the lighter soils. He favored sowing several varieties. Wheat that was the best one season perhaps would not be so the next. He advocated feeding off the crop with sheep. They set the soil and the wheat stood a dry spell better. A Government farm should be established in the North for selecting and raising wheat true to type and for proving which varieties were best suited to the district. Mr. T. Hawke favored feeding off the crop in wet seasons but not in dry. Stock had been on his crops until August in some years and then he had secured good yields. He believed in selecting and grading wheat. He had procured small quantities of selected seed from Parafield and intended to continue to do so as he found it a success. From Parafield selected Federation he had secured one-third more than from his own unselected grain sown under similar conditions. It did not pay farmers to go in for small experimental plots, they had the Government farms for that purpose. Mr. B. E. Schmidt considered Federation was not yielding as well as it had formerly. It was also subject to black rust or flag smut. Yandilla King

was a very hard wheat to thresh. He was not in favor of feeding off in dry weather as the stock pulled up a considerable amount and the plants did not stool well. It was a waste of valuable time for farmers to carry out small experiments. Mr. S. E. Greig had not been troubled with Federation shaking out. He had grown it extensively. Mr. Howard thought it would be a good idea for each farmer in the district to hand select about 6lbs. of seed from the best heads of Federation in his crop. One farmer could sow the lot and they could procure seed from him. If this were done every season a supply of first-class selected, acclimatised seed would be assured. Members generally agreed that the following varieties had proved suitable for the district:—Marshall's No. 3 and Yandilla King (late), Federation and Caltowie Knobby (mid-season), Gluyas and Viking (early). It was estimated than more than half the area under cultivation in Willowie this season would be cropped with Federation.

Wilmington, April 16.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. J. Hannagan, Scholesfield, Hill, A. R. and E. J. Gloode, S. and D. George, G. Shuppan, Zimmerman, and B. Jericho (Hon. Sec.).

CONTINUOUS CROPPING.—Mr. Zimmerman read a paper under this title. Where the practice of continuous cropping for hay was adopted, he said it was necessary to plough the land to a depth of 3½ in. or 4 in. directly after the first good rain following the harvesting. Harrows should then be put over it. If weeds showed in the early part of the year the ground should be scarified to a good depth, but not sufficient to disturb the weeds turned under in the furrows. Early wheat was best, and if the weather was suitable, cross-drilling was advisable, ½ bush. of wheat and 40lbs. of high grade mineral super. being put in each way. Poor patches, such as those consisting of a sandy soil, could be supplied with a dressing of stable manure and sown with oats. He had ploughed a piece of ground in February and sowed it during the first week in June with ½ bush. of Viking wheat and 40lbs. manure one way and ½ bush. of Jacob's and 40lbs. of super. across. The return averaged 2 tons of hay to the acre. The next year light rains fell during April and resulted in the germination of weeds in patches. The land was ploughed during the last week in May, the drill following, sowing 1 bush. of Riverina and Marshall's No. 3 wheat mixed and 100lbs. of super. to the acre. The average yield again equalled 2 tons to the acre. For the third year in succession the land was cropped, the ploughing following a rain on the 8th March. The harrows and scarifier were subsequently run over the ground, and about the beginning of July a mixture of 30lbs. Riverina wheat and 20lbs. of white oats with 60lbs. of super. was drilled in. The oats were practically a failure, but the yield of hay averaged over 2 tons to the acre. During the past 25 years the land had only been fallowed once, every other year it carried a crop. In reply to questions, the writer of the paper said it was inadvisable to sow dry on account of the clover and dandelions which should be allowed to start and be destroyed before seeding.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Beetaloo Valley, April 23.

PRESENT.—Messrs. A. H. Jacobie (chair), Bartrum, Burton, Woolford, Ryan, Curtin, Bartrum (Hon. Sec.), and two visitors.

SEEDING.—In a short paper on this subject Mr. P. Curtin said fallow should be well worked up and free from weeds before sowing, which should not be done before rain. After drilling, the harrows should be run over the land to cover the seed. About a bushel and a quarter of wheat and 80lbs. of super. should be sown to the acre, the wheat being drilled in to a depth of about 2 in. The practice he recommended was to sow about 30

acres of an early variety, such as Gluyas or Golden Drop, to enable an early start to be made with the reaping. Marshall's No. 3, Federation, and Yandilla King could be then sown, the earlier varieties being put in as the season advanced. Paddocks dirty with wild oats should be sown with early wheats, and it was advisable, where the oats were very troublesome, to cut the crop for hay before they seeded. Wheat for seed should be carefully graded. Pickling should be done a week before seeding, 11b. of bluestone being used for five bags of wheat. In discussing the subject, Mr. Woodford thought it advisable to sow the late varieties of wheat early and finish with the earlier sorts. Gluyas and Golden Drop, if sown too early, might be affected by frosts. He advised cross-harrowing after drilling. Mr. A. Bartrum did not believe in pickling seed in the bag as unless great care was exercised the wheat in the centre was not brought into contact with the pickle. Mr. Jacobie advocated floor pickling. The hon. secretary thought thorough grading of seed absolutely essential. Where early varieties were sown late a bushel and a half of seed should be put on to the acre.

TOMATO-GROWING.—The chairman read a short paper on this subject. To raise young tomato plants it was necessary to provide a hotbed consisting of a depth of 2ft. 6in. of stable manure. A frame made from 10in. boards should be erected on the bed, and around it should be placed more manure. The seeds should be put in and buried slightly with sand. A glass or calico cover should then be placed over them. Sandy soil, with the addition of stable manure, was most suitable for the growth of the plant. In the absence of a natural sandy soil, a trench about 1ft. deep should be filled with sandy gravel and manure. The varieties which would do well here were Early Ruby, Early Pinks, Trucker's Favorite, and Duke of York. Mr. J. Burton had secured best results from Early Hanna and Chalk's Jewell varieties. He preferred dressing the land with stable manure which should be well dug in. Chemical manures might be added as the plants advanced towards maturity.

Belalie North, March 22.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. P. J. O'Leary, A. H. Warner, P. Fox, D. Fox, H. Waldhuter, D. Smart, F. D. Bladon, W. T. Hall, W. Cummings (Hon. Sec.).

EXPERIMENTAL WORK.—Mr. Warner suggested that it would be an advantage if the Branch undertook some experimental tests with varieties of wheat and quantities of super. this season. He also would like to see a test conducted to show whether any benefit was derived from cross drilling wheat. In the discussion it was stated that in some parts of the paddocks where the drill had not put the manure in the land no difference could be seen in the crop, while in other instances the manured portions were undoubtedly better than the unmanured. [Mr. Warner's suggestion is an excellent one. Only by carefully conducting experiments can the most payable quantities of super. and the best varieties of wheat be determined in any given district. It is to be hoped that not only this, but other Branches will undertake, through their members, to do some such work. It is obviously impossible to judge by the appearance of the crop whether the manure or the extra quantity of manure pays. An extra bushel or two in the harvest would more than pay for the extra manure, but this increased yield could not be accurately judged in the standing crop. The experiments should be continued for several years, and the average results worked out to secure the most valuable data.—ED.]

Booleroo Centre, April 12.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. W. Michael (chair), W. H. Nottle, sen., J. Carey, sen., J. C. Schmitz, G. R. Hein, W. Whibley, B. Giddings, J. Carey, jun., H. C. Jaenschke, B. Nottle, D. Michael, H. E. Kirkland, W. A. Birrill, M. Larkin, J. M. Carey, and A. E. W. Burns (Hon. Sec.).

DRILLING WHEAT.—Mr. D. Michael read the following paper:—"In this district by far the greater portion of the land sown is fallow, so I purpose dealing with drilling in fallow land. It is essential that the ground should be well worked before the drill is put into it. The surface should be fine, but the subsoil kept firm, as when in this condition the soil retains more moisture. The best method of securing a fine surface is by repeated harrowing after rains during the spring and summer. When rains do not fall and so enable the fallow to be harrowed down, rolling has to be resorted to. The objection to rolling ground when it is dry is that seeds of weeds which are embedded in the dry clods do not germinate until rain comes, and if by that time the crop is sown the

weeds become a nuisance in the crop. If the fallow is worked thoroughly it is not necessary to drag a harrow behind the drill, although if the ground is very wet a light harrow helps to bury the seed. The seed should not be buried deep, especially when there is a danger of the wheat malting in a damp subsoil. For late wheats sown early in the season and unpickled I think from 45lbs. to 50lbs. per acre, according to the size of the grain, is sufficiently thick. For earlier wheats sown later I would advise up to 55lbs. per acre when unpickled. However, for sowing when the soil is wet, or if there is a suggestion of smut about the seed it should be pickled with bluestone. From 55lbs. to 70lbs. per acre, according to the time of the season and the size of the grain, should be sown. Half a hundredweight of super. should be used to the acre. However, some soils, notably red ground, will take more, and on ground on which crops are inclined to burn, a lesser quantity of manure is advisable. As the land around here is very dirty, farmers prefer waiting for a good rain before drilling; and as that frequently means late sowing I would advise the use of a fairly wide drill, say, 16 or 17 hoes, 7in. apart, to enable more ground to be covered per day. There is a danger of a wider drill sagging in the centre, and in rough ground it buries the seed at uneven depths." Mr. W. Nottle, sen., favored the practice of dragging a harrow behind the drill for the purpose of levelling the surface, and burying grain which might not have been properly put in by the drill. Members thought that where hoes were zigzagged behind drills the hoes in front buried the seed much deeper than those behind. Seven-inch drills were generally preferred. Seeding at the rate of a bushel or more to the acre was favored.

Burra, April 25.

(Average annual rainfall, 17·64in.)

PRESENT.—Messrs. F. G. Scholz (chair), S. Burns, J. H. Rogers, H. H. Thomas, and F. J. Carey (Hon. Sec.).

SHOEING HORSES.—In a paper on this subject Mr. S. Burns said the constitution of the horse's foot rendered it important that care should be exercised in shoeing. The hoof should not be made brittle by burning with the shoe, nor should it be cut any more than was necessary to secure an even surface. The shoe should be sufficiently concave to prevent pressure on the sole of the foot, but not enough to allow of the collection of gravel. When the foot was placed fairly on the ground the heels of the shoe should be in line with the round parts of the animal's heel. The shoe should be clipped at the centre of the toe, and the heels should not project too far either way, as there was danger of the shoe being pulled off, or cutting the inside of the leg of the animal. Nails should not be driven too high or they were likely to prick the foot. The frog acted as a buffer, and while rough portions of this could be removed the solid frog should not be interfered with.

Crystal Brook, November 22.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. M. P. Pavy (chair), W. W. Lovelock, J. Hill, W. Hutchison, J. H. Dingle, W. J. Venning, R. Heaslip, W. S. Carmichael, H. S. and E. Billingham, G. A. Solomon, J. Duffield, J. Teakle, G. Miell, B. Weston, R. R. Shaw (Hon. Sec.), Lieut.-Col. Miele and two visitors.

REGISTRATION OF STALLIONS.—Mr. W. J. Venning read a paper in which he characterised the proposed registration of stallions as an unwarrantable interference with the farming community, which would only result in increasing the cost of service and curtailing the breeding of horses. Mr. Shaw did not think the result of the proposal would be an increase in the cost of breeding to any large extent. If a charge of 2s. per head extra were made on 50 mares the increase would pay a registration fee of £5, and the additional cost of service would be more than counterbalanced by the improvement in the class of horse thus brought about. Mr. Weston had recently seen some weedy specimens of foals selling at from £3 to £5 per head, while others of a much better class were realising from £15 to £20. Mr. G. Miell said in England the mares as well as the stallions were registered. Mr. Heaslip mentioned that the idea was to endeavor to free stock from hereditary diseases and unsoundness of any kind. At the present time horses to be eligible for competition in show rings were required to possess a certificate of soundness signed by a veterinary surgeon, but if they failed to secure this certificate they were still used for breeding. Some owners knew their horses would not pass the veterinary test, and they did not for that reason attempt to show them. The breeders had nothing to

guide them in determining whether these horses were sound or not. Registration would probably wipe out the weedy animals plying for hire at a very low fee. Mr. R. J. Dennis thought it would eliminate the inferior animal and give the man with a valuable horse some chance of securing a return for his outlay. Mr. Carmichael said farmers were breeding a lot of beefy-hocked, unsound animals that were no credit to the breeder or to the State. To get 20 horses sound in every particular, true to type, free from hereditary ailments, a man would have to travel a long distance, even in this district, which was noted for the high standard of the horses. He would not only advocate the registration of stallions but the mares also. Mr. Hill thought the registration fee to be of any material benefit should be £50. At the present time farmers took their mares to their neighbors and paid about £1 per head for service. Mr. Teakle thought it would put a check on the inferior animals, of which there were too many at the present time. Mr. Venning, in reply, said too much stress had been laid upon the wiping out the so-called inferior animal. His experience had been that it was not the horse that took the prize in the show ring that left the best stock for farm work, but the compact, nuggety, active, quiet-tempered, constitutionally-sound horse. The farmers themselves were the best judges of the most suitable horse for their own particular work, and he therefore thought the less restrictions there were the better. Mr. R. J. Dennis thought Mr. Heaslip was going too far in desiring to apply the scheme to horses kept for private use. It was a well-known fact that it paid to breed good horses, and if all people adopted this practice the country would be much better off. Any measure that would help to achieve that end would receive his support. Mr. Billingham could not see any reason why a very high fee should be charged. If a horse had to pass a veterinary examination before it could travel, that seemed to be practically all that was necessary.

Julia, April 19.

(Average annual rainfall, 1937in.)

PRESENT.—Messrs. T. Prior (chair), A. Pfitzner, O. B. Pfitzner, D. S. Heaslip, A. Dunstan, T. Brown, T. Neylon, C. Nash, H. B. Traeger, E. Richards, B. J. Schmidt, D. Hombsch, T. Carter, R. W. Rowett, G. Gaerth, J. Dunstan, J. T. Freeman, W. Copley, W. H. Neal (Hon. Sec.), and five visitors.

SELECTION OF SEED WHEAT.—Mr. A. B. Pfitzner read a paper on this subject. He suggested that members should select a few of the best heads from each variety of wheat which they intended sowing, planting these in plots with the idea of comparing exactly the results received. He strongly recommended putting wheat intended for seed through the grader at least twice in order to assure an absence of seeds such as drake. Federation was about the best wheat for the district so far as grain production was concerned, good results also being received from Yandilla King and Dart's Imperial. King's White and Dart's Imperial were both good hay wheats, but the latter was inclined to be somewhat late. Members discussed various methods of pickling wheat. Mr. B. J. Schmidt had tried formalin and found it very successful. The grain germinated well but the formalin was rather expensive. Mr. Prior advocated the use of a bluestone solution, different varieties of wheat requiring different strengths of pickle. He had found that the germination of Yandilla King would be seriously affected if a strong pickle were used. For general use he recommended 1lb. of bluestone to 5galls. of water. Mr. H. B. Traeger thought a 1 per cent. solution was very satisfactory. Mr. J. T. Freeman had sown wheat that had been pickled 12 months previously, and it germinated quite as well as that which had been freshly treated. [Members are advised to read Professor Perkins' address delivered at the Kadina conference on this subject, and printed on page 1158 of the current issue.—ED.]

Port Broughton, March 27.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. W. R. Whittaker (chair), D. Alchurch, Donnelly, Hill, Whittaker, jun., Rantley, Barclay, Fletcher (Hon. Sec.), and one visitor.

GRADING SEED WHEAT.—A discussion on this subject was initiated by the hon. secretary, who read an article from the Roseworthy Agricultural College "Student." He mentioned that big grains haphazardly taken from a bag of ordinary wheat would possibly reproduce poor wheat plants. To ensure a good plant it was necessary to first select the parent plant in the field and from this the best grains of the best heads. Mr. Donnelly described the process of hand selecting and improving wheat by continuous and systematic selection.

Port Pirie, April 5.

(Average annual rainfall, 12½ in.)

PRESENT.—Messrs. C. E. Birks (chair), T. Johns, F. Johns, W. Mundy, D. McEwin, H. G. Hawkins, E. B. Welch, W. Wright, A. Bond, E. J. Hector, and A. M. Lawrie (Hon. Sec.)

THE DOG NUISANCE.—Mr. T. Johns reported that he had experienced considerable loss through the ravages of dogs that were allowed to roam at large in the district. He thought legislation should be introduced which would compel owners to tie up their dogs from sunset to sunrise. Mr. Hawkins had also lost sheep, and together with a number of members agreed that an increase in the licensing fee, together with the destruction of unlicensed dogs would go a long way in the direction of improving matters. It was decided to bring the matter up for discussion at Congress.

Redhill, March 18.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. G. A. Button (chair), Cox, J. J. and W. Hayes, Potts, E. and B. Steele, W. J. Burton, Briggs, Pengilly, Jackson, Campbell, Wheaton (Hon. Sec.), and one visitor.

FARMERS AS NEIGHBORS.—Mr. F. Jackson read a paper on this subject. The growth of a neighborly feeling amongst farmers, he said, would result in country life being more pleasant socially, and incidentally contribute toward the financial success of farming. For example, a farmer might conduct an experiment in some out-of-the-way corner of his holding, and there was a general tendency to hide the fact if the results were not satisfactory. With a feeling of confidence existing between agriculturists, and the discussion of results of experiments, whether they failed or succeeded, a considerable amount of valuable knowledge could be disseminated. The purchase of some implements or machinery which would be expensive for the individual might be secured co-operatively. Members generally agreed with the ideas expressed by the writer of the paper.

Redhill, April 15.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. McAvaney (chair), Coffee, D. E. and B. Steele, J. J. and W. Hayes, Lines, Potts, Treloar, Dick, G. A. and W. J. Button, Pengilly, Kelly, Campbell, F. P. H. and F. A. Wheaton (Hon. Sec.), and two visitors.

SEED WHEAT.—Messrs. J. J. Hayes and P. H. Wheaton contributed a paper on this subject. The farmer should take careful note of the soil and climatic conditions, they said, when he was selecting his wheat for seed. He should make a practice of retaining over harvest more wheat, of both early and late varieties, than he was likely to require for sowing. When the season opened he should select the varieties that he intended sowing with due regard to the conditions which promised during the year. He should not discard seed because it did not prove successful in one year. A few acres only of new varieties were sufficient to give it a test. The standard of the seed could be well maintained if farmers made a practice of selecting the best heads from their crops, these being sown to provide seed. The sprinkling method of pickling was not satisfactory. Dipping was slower but surer. A bag was suspended in the solution contained in a barrel, and the seed was slowly poured into this, the smut balls rising to the surface and being skimmed off. After the grain had been stirred and soaked in the solution for about five minutes it should be taken out and drained. Formalin constituted a cheap and effective pickle which was easy to mix, and did not tarnish metal as did bluestone. The majority of members preferred bluestone for pickling as it could be kept without affecting the germination. Formalin and fungusine had also been used. Some soils, it was thought, were contaminated with smut, and pickling would not prevent the fungus attacking the crop when this was the case. Mr. F. Wheaton had used the seed grader for several years and fully believed that the use of the machine paid well. When changing seed it was necessary to see that the new seed was absolutely free of disease of any sort.

Whyte-Yarcoile, March 29.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. G. F. Jenkin (chair), J. E. Hunt, McGregor, McLeod, G. R. and J. R. Mudge, Wittwer, Robinson, W. Mudge, and E. J. Pearce (Acting Hon. Sec.).

EXPERIMENTAL WORK ON THE FARM.—The following paper was read by Mr. E. J. Pearce :—"The value of experimental work is being more and more recognised by the experts connected with the Agricultural Department. Much may be done and is being done by them that cannot be carried out so effectively by the ordinary farmer in the way of experiments requiring the skill and scientific training of the specialist and the chemist. But there are other and more simple experiments that come well within the power of the ordinary practical farmer such as—The best depth to plough the land in different localities. Will it pay to use heavier dressings of super.; and what is the most profitable quantity to use, having regard to both pasture and crops? What quantity of seed is the most profitable to sow? What profit is there in grading seed wheat? Many farmers hold that grading undoubtedly pays, if only the small and cracked grain is saved for poultry or pig feed. Others, who purchased the grader when it was first placed on the market, throw the machine to one side after the first year. If the only value of grading lies in the saving of small and cracked grain it is questionable if it pays for time spent and interest on the cost of the machine; but if graded seed will add 1 bush. or 2 bush. to the yield of the crop, then it will pay the farmer to use it. This can easily be proved by experiment. Can we increase the stock-carrying capacity of our farms by (1) sowing catch crops such as barley and rape on stubble land, (2) by sowing peas on a part of our fallow and feeding them off, (3) by hand feeding sheep to tide them over a time of scarcity? Can we adopt a more profitable breed of sheep than the Merino for our farm conditions? Can we rear breeding ewes, or is it more profitable to purchase them in the market? These are a few of the most obvious lines on which experimenting might be done, and if only one of them led up to a more profitable result than we obtain from present methods, who can estimate the value of it? If by ploughing in. deeper we are able to grow 2 bush. more per acre, or if by sowing a quarter of a bushel more seed a like increase is obtained, the result, when spread over the district, would be very considerable. The work, if undertaken, must be done thoroughly. It is useless to run a few widths of the drill across a paddock with more seed or more manure, or plough a strip deeper or shallower, and guess at the result and the relative values. Such an experiment is of no practical value. The drill surveyor, if in good order, will measure the plot accurately enough for the purpose when the area of the plot in an acre or more, but each separate plot must be harvested separately and the produce weighed. All the plots should be treated exactly alike in every respect, excepting with regard to the special variation to be tested. For instance, if we wish to test the value of light or heavy sowing, each plot should be cultivated and manured similarly, let the quantities of seed used be the only difference; and so in connection with any other experiment. Do not trust to memory, but keep a notebook. There are, of course, some experiments which I have suggested of which it would be impracticable to tabulate exact results in the first instance. With a pea crop on fallow it would be necessary to sow a small area first and see what sort of a crop we could grow, arranging it so that its effect on the succeeding wheat crop could be tested by sowing an acre adjoining, and reaping separately. Whilst the fodder value of the peas would be a matter of guesswork, the result on the succeeding wheat crop could be ascertained exactly. So with the best breed of lamb for the lamb trade. We should rear them under as near as possible identical conditions and note the result in the field and in the market. I should like members to volunteer to undertake one or more of the experiments indicated, choosing the one that appeals to them most strongly, and one that is most suited to their conditions; to carefully tabulate the results and report to the Branch. Let us bear in mind that it is not only the experiments that turn out successfully that are of value. We also learn by failures, and such should be reported also. Surely we should do something as farmers to add to the sum total of knowledge on matters connected with our calling. I can safely promise as a result of experiments carefully carried out a greatly increased interest and pleasure in farm work." In the discussion which followed members were all agreed as to the value and necessity of experimental work, both in the interests of the Bureau and the farmers for whom it existed. The difficulty they found was in tabulating results and the loss of time (particularly in the harvesting) that small plots entailed. A few of the members intimated their intention of trying some of the experiments suggested,

LOWER-NORTH DISTRICT.
(ADELAIDE TO FARRELL'S FLAT.)

Balaklava, April 12.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. R. S. Goldney (chair), H. Roberts, T. A. Thomas, W. J. Gleeson, H. M. Tuck, H. L. Twartz, J. A. Wurfel, B. R. Banyer (Hon. Sec.).

WEIGHING WHEAT IN BULK.—Mr. Gleeson, in initiating a discussion on this subject, said the farming community generally would benefit by the introduction of the weighbridge system of weighing wheat. He read the report of the meeting of the Advisory Board of Agriculture dealing with this subject and printed on page 794 of the February issue, and mentioned that attempts were being made to introduce the system at Crystal Brook. Mr. Wurfel said it had been in vogue in Victoria for 10 or 12 years. It was a great advantage to the agents and was fair to both parties. The weighbridges were licensed. The farmer could have his wheat weighed on the bridge or on the scales, whichever he chose. There was no waiting for teams to unload, and he had never had any difficulty about the weights given by the weighbridge during his three or four years' experience. Sometimes small scales were found to be 3 lbs. or 4 lbs. out, and if a bag was not properly placed on the scale it affected the weight. Mr. Twartz had seen both systems in operation. The reliability of the small scales depended on the competency of the man using them. He did not favor the weighbridge system. The construction of the bridges would be a heavy item, but they would certainly expedite the unloading of the wheat. Mr. Tuck thought there were no serious objections to the system. The farmers had a check because the wheat could be weighed into the wagon. He would just as soon accept the weight of a weighbridge as that of small scales. The charge made for weighing would pay the interest on the cost, and in time would also pay for the bridges themselves. Mr. Roberts said any weight under half a pound was not recorded by the buyer, so there might be a loss on each bag, and if a large number of bags were delivered the loss was considerable. If the wheat were weighed in bulk that loss would not occur. The Chairman said it would save much time in the delivery of the wheat. He saw no objection to the bridge if it were properly looked after.

Blyth, April 19.

(Average annual rainfall, 16.28 in.)

PRESENT.—Messrs. A. L. McEwin (chair), J. S. McEwin, C. H. Zweck, W. Pratt, A. A. Schulze, W. J. Nannes, W. H. Best, M. and T. Williams, S. R. Neville, D. Crawford, jun., F. A. and A. P. Kirchner, A. Hamilton, J. and H. Williams, H. Neumann, E. C. Deland, J. T. Harmer, A. Dunstone, H. W. Eime, W. O. Eime (Hon. Sec.), and six visitors.

MIXED FARMING.—In a paper on this subject Mr. H. W. Eime said that in the different districts of the State it would be necessary to adopt different methods of farming on account of the variation of soils, rainfall, &c. In this district in the past cropping once in three years, combined with the keeping of sheep for wool and lamb raising, dairying and cattle-rearing had been the most profitable means of working the land. However, with the increase of land values and the scarcity of labor, different methods would have to be adopted. He did not think fodder crops could be grown in the district every second year, a better practice to his mind being alternate bare fallow and wheat crops. The stubble fallow would return better results than grass land fallow, and on a farm of about 900 acres he recommended that 400 acres should be cropped every year, 50 acres should be sown with barley or oats just before seeding to be used as a feed paddock, 400 acres being fallowed. About 12 or 14 working horses would be required, and with the most up-to-date farm machinery and implements, one farm hand only would be necessary. If the farmer reared three or four foals every year, kept a pair of trap horses, and two or three cows, sufficient feed could be obtained from 50 acres. About 50 sheep should be kept and run over the fallows occasionally. It was not wise to keep too many, and they should always be taken out in plenty of time to enable the fallowing to be completed at the latest by the first week in August. Half the stubble should be burnt about the middle of March, the remainder being left until after the first rains. That first burnt should be cultivated immediately, but not fallowed until the other portion had been so treated. Good feed would then be available. All the fallow should be harrowed twice after the plough, then cultivated and harrowed immediately after rain. No less than

1cwt. of manure should be applied to the land at seed time. The adoption of this method he felt sure would result in the average yield of the district being considerably raised. If the three-year rotation system were continued it would be necessary to grow fodder crops to make the business pay, and the climatic conditions were not suitable for this. In discussing the subject, Mr. Pratt mentioned that a piece of land which he allowed to lie out for three years before fallowing returned an average of 9bush. to the acre, whilst a fallowed stubble in the same year yielded 15bush. Mr. Nannes had not received good results from cropping stubble fallow. Fifty acres he thought was insufficient for feed for farm stock. Mr. Best thought 450 acres would be too much to work with from 12 to 14 horses. In his opinion applying over 100lbs. of super. to the acre was a wasteful practice. Mr. McEwin believed it advisable when dealing with new land to crop it every second year and apply 50lbs. of super. to the acre. He had worked 400 acres with 10 horses. He thought it necessary to cut sufficient hay to carry the stock through the year, reckoning that one horse would require about 6 tons.

Clare, March 21.

(Average annual rainfall, 24in.)

PRESENT.—MESSRS. J. Dux (acting chairman), C. J. Jarman, R. Hunter, C. Pink, C. Scott, J. Seales, J. Berridge, G. Victorsen, F. W. H. Lee, F. Keen, A. J. Lee, F. G. Hicks, W. Taylor, E. Victorsen, H. Hanna, B. Lloyd, A. Hill, M. L. Nolan, W. J. Maynard, F. J. Knappstein, P. H. Knappstein (Hon. Sec.), and two visitors.

MANURING FRUIT TREES.—Dealing with this subject in a paper, Mr. M. L. Nolan said there could be no doubt that the extra returns of fruit amply compensated for the cost of applications of manure to the trees. During the past three years he had applied complete garden manure twice and bone super. once at the rate of about 2cwt. to the acre to vines. The effect was very marked, especially where the soil was poor. There was a general increase in vigor, wood, and healthy appearance, and the fruit-bearing capacity increased in proportion. The natural fertility of some soils, however, was so great that it was open to question whether application of fertilisers would be payable at present but on the majority of soils such dressings were indispensable. Mr. Hicks had neglected to manure six rows of vines in his vineyard, and the crop on the manured portion was fully 100 per cent. better than that on these rows. Mr. Jarman thought departmental experts should supervise systematic experiments for the purpose of ascertaining to what extent manuring paid. Mr. Nolan agreed that this should be done.

COMPULSORY REGISTRATION OF STALLIONS.—In a paper on this subject Mr. J. Seales said that until breeding was regulated by legislation in this regard they could not hope to have clean, sound horses. The introduction of veterinary inspection had been bitterly opposed in England at first, but to-day no farmer would think of utilizing a stallion which had not the Government certificate of soundness. He suggested that a stud book should be established for draught horses, and that all draught stud colts and fillies foaled, say, in 1914, should be entered in the stud book. No stallion without a stud book certificate in 1919 should be registered, and in 1920 any person owning or keeping a stallion without a stud book certificate, and certificate of soundness, should be liable to a penalty of £20 and have the horse in question seized. These conditions would allow six years in which to establish a clean stud, and the same length of time to get rid of all unsound animals. The question was discussed at length by members, and a motion in favor of compulsory registration and the establishment of a stud book was carried unanimously.

Clare, April 21.

(Average annual rainfall, 24in.)

PRESENT.—MESSRS. D. Menzie (chairman), J. H. Knappstein, M. L. Nolan, C. T. Jarman, B. Lloyd, F. Pink, C. Pink, J. Dux, C. J. Radford, F. J. Knappstein, R. Hunter, J. Berridge, W. Taylor, A. Hill, E. Kelly, F. W. H. Lee, E. Victorsen, S. Pascoe, A. J. Lee, R. B. James, P. H. Knappstein (Hon. Sec.), and one visitor.

FEEDING PEAS TO SHEEP.—In a paper under this heading Mr. J. H. Knappstein said one of the best discourses on this topic had been given by Mr. Isaacson at the Saddleworth conference, where he proved by figures how well he had succeeded in making the growing of peas profitable on his farm. It must be remembered, however, that Mr. Isaacson's experience had been obtained under rather exceptionally favorable conditions, as his holding was not only in one of the best districts in South Australia as regards rainfall,

but the soil was also very rich and fertile, so they should not feel discouraged if under somewhat less favorable conditions they did not quite obtain the results achieved by that gentleman. His experience in growing peas extended over five years, and on a farm which was considered one of the poorest in the district; in fact, it was so poor that after fallowing and working it well the first year the crop did not average more than 8bush. Originally he intended to sow peas early, with the idea of ploughing them under later on to form humus in a very poor sandy wet soil, but they had not grown high enough by August or September, so he left them to ripen and put on the stock (mostly sheep), which were in fair order then but rapidly became prime. The same paddock was ploughed up in autumn and sown with wheat, and yielded double that of the first crop. Since then he had continually grown peas in rotation—i.e., peas, wheat, and Algerian oats—with the result that besides the increased yields the land was now in much better heart and covered with clover. In the season 1911-12 he had 1,400 lambs on about 90 acres of peas, and they returned a profit of about 3s. per head. It was a mistake, however, to turn very poor or unthrifty lambs on peas, as the season for feeding off was rather short; it was advisable to get half-fat or very forward stores. His experience was mostly with cross-bred lambs bought in the Adelaide market, but he had been informed that pure Merino lambs were more difficult to fatten. The system of harvesting field peas was as yet somewhat primitive, and was more expensive than that for either wheat or oats, so he had bought his seed mostly from the Mount Barker district at from 3s. 6d. to 3s. 11d. a bushel. One season he raked up seven acres and put the crop through the beaters of an ordinary reaper attached to a two-horse power spraying engine, and it averaged a return of about 15bush. per acre, after leaving about 5bush. on the ground; but this work came during the busy fruit season. Peas required a well-worked soil, and he found seeding at the rate of 2bush. per acre with 100lbs. super. had answered very well. In this district he drilled them in during June and July, that was after other cereals were sown, so it did not interfere with other work, and the land was treated as fallow and ploughed up during March and April and then sown with wheat. The difficulty of ploughing before rain was overcome by using a heavy three-furrow disc plough, which did good work to a depth of from 5in. to 7in., even in very dry and hard ground. That implement did not seem a favorite in South Australia, whereas in Victoria it was in universal use; and as far as he could say it was cheaper to work. Six medium horses were sufficient draught, even in hard ground. This was the third season he has worked with the disc plough, and beyond replacement of worn out discs and axle caps no repairs had been necessary, and the cost had not been more than 3d. per acre for the work, including everything. He had not ploughed up any bare fallow for over four years, and the whole of his arable land was put in every year, with very encouraging results, so it had practically doubled the extent of his land, which in this district of comparatively small holdings and high values was a great gain. Of course, the crops were not as clean as on well-worked bare fallow, but they were not dirtier than many other crops which were on fallow. Algerian oats, if sown rather thickly, would choke out very many weeds, and they could then be closely fed off by sheep every year. So far the land had returned more per acre than when it was worked under the old system of alternate bare fallow and crop, and the soil was certainly in better heart. Mr. Jarman indorsed the views contained in the paper. Harvesting peas was costly, and it was best to procure the seed outside. Peas increased the yield of future crops. It would be an advantage to the small holders of land if they put in a few acres every year. Mr. Lloyd had sown 38 acres of peas very late last year, and the late rains brought them on well, especially on patches where stable manure had been applied. He turned in 230 old ewes in forward condition when the peas had dried off, and they fattened quickly and averaged when killed and dressed 55lbs. per carcass. The sheep cleaned up the peas in 14 weeks. In replying, Mr. Knappstein stated that he applied 100lbs. of bone manure and super. mixed in equal quantities per acre for the wheat crop when sowing after the peas. Frost would only affect the crop when blooming. No stock would eat peas until they were thoroughly ripe. Mutton was always firmer and of better flavor when the sheep feed on this feed, and butchers paid a high price for sheep so fed.

Gawler River, March 19.

(Average annual rainfall, 18in.)

PRESENT.—Messrs. W. J. Dawkins (chair), A. J. Bray, F. Bray, J. H. Dawkins, H. Dunn, J. Hayman, E. Winckel, N. J. Pedrick, A. M. Dawkins, C. Leak, B. F. Hillier (Hon. Sec.), and three visitors.

DAIRY COWS.—Mr. E. Winckel read a paper on this subject. While it was necessary to keep the different breeds pure, he said close breeding was a mistake, as small, deformed, sickly cattle were the result. The practice of culling any bull calf from the herd and rearing it to do duty as a sire was responsible for the inferiority of a large percentage of dairy cattle. He strongly opposed the rugging of milking cows, for, whilst the flow of milk might be increased in this way, the progeny would tend to degenerate. Farmers would do well to select strong, hardy cows of whichever breed they fancied. Deep milkers yielding a high percentage of butterfat should be looked for. While it was not necessary for dairymen to raise purebred animals, every effort should be extended to see that their cows did not become small or weedy. In discussing the subject, Mr. H. Dawkins said that if cows were not rugged in winter they would seek natural shelter. This pointed to the need of artificial protection where natural shelter was deficient. Mr. Higgins agreed. Mr. Pedrick believed in rugging. It was injurious to the animals, however, to cover them with bags, which became saturated with water. Bags were easily torn off, the animal then being very likely to take a chill. Mr. A. M. Dawkins did not agree with the writer's remarks with regard to inbreeding. Degeneracy was more likely to result through lack of feed and care when the calves were young.

Lyndoch, April 17.

(Average annual rainfall, 23in.)

PRESENT.—Messrs. A. Springbett (chair), J. Caldecott, H. Schrader, R. W. Dunstan, E. P. Hausler, W. H. Lawes, P. N. Burge, J. E. Linke, E. Springbett, and J. S. Hammat, (Hon. Sec.).

VISIT TO WINE CELLARS.—On April 14th members, together with friends to the number of 32, visited Chateau Tanunda, Seppeltsfield, Yalumba, and Penfold's wine cellars. The day was delightfully pleasant. The members considered the many processes in connection with winemaking and distilling of spirits were of a very instructive character. The visitors were much impressed with the manner of working at Seppeltsfield. Gravitation played an important part in the various processes, the buildings being situated on the side of a steep hill. The bonded store with its row upon row of barrels filled with spirit all secure under double lock and key; the distilling-house with its large still and various appliances for the extraction of the spirit; the cellars with their tiers of barrels for maturing the various wines; the vinegar-making house with its machinery, its warm temperature and acid aroma; the thousands of barrels of vinegar; the up-to-date offices for the transaction of clerical work, one and all were objects of study and interest. Perhaps the most pleasing surprise was the flower garden, where Mr. B. Seppelt's skill was shown to great advantage. The garden was gay with blooms; probably no garden in the State looked better in the month of April. The immense new still at work at Penfold's, Angus Park, said to be the largest brandy still in the world, was a matter of very great interest. The machinery, which has only been recently installed was the most up-to-date seen during the day. Members expressed the opinion that the operations witnessed proved very valuable, interesting, and instructive, and hearty thanks were accorded to the various owners and managers for their courtesy and kindness.

Riverton, March 14.

(Average annual rainfall, 20½in.)

PRESENT.—Messrs. F. Phillips (chair), W. B. Davis, R. Wilkinson, J. Johnson, J. P. Schultz, J. W. Kelly, E. H. R. Scholz (Acting Hon. Sec.), and one visitor.

PUBLIC SHEEP DIP.—The Branch decided to call a public meeting for the purpose of considering the advisableness of erecting a sheep dip in the town, and at the same time discussing the matter of the compulsory registration of stallions.

EARLY GREEN FEED.—Mr. F. Phillips mentioned that the early rains afforded excellent opportunities for farmers to profitably sow crops for fodder. For newly-ploughed land he suggested barley or peas. The former crop could be fed down until September, and there would then be sufficient time to fallow the land. Where peas were sown they could be fed off in February, the land being cultivated afterwards. Several members had received excellent results from barley.

Saddleworth, April 18.

(Average annual rainfall, 20in.)

PRESENT.—Messrs. P. Manning (chair), F. H. Kelly, J. H. Frost, J. H. Eckermann, Theo. Eckermann, R. G. Townsend, W. Scales, and F. Coleman (Hon. Sec.).

AFFORESTATION.—The subject of forest conservation was discussed, and an address by Elwood Moad, Chairman of the State Rivers and Water Supply Commission of Victoria was read, and was considered a powerful statement in favor of forest conservation and of the State's obligations in the furtherance of such work. Mr. F. H. Kelly, who had resided at Wirrabara Forest, spoke of the value of the pines there. The trees were planted 8ft. apart each way, and within a period of 20 years were felled and cut into packing cases, realising £2 10s. per tree. As 680 trees could be planted on one acre, and allowing that only 50 per cent. of these matured to the above standard, the return worked out at £850 per acre in 20 years, or an average of £42 10s. per year. On such a basis, the remark of the late J. H. Angas that the plantations on Hill River were the most valuable asset on the estate could be easily understood. The increase in the value of timber, which was the result in a large measure of wasteful destruction of forests, made the planting and care of trees on watersheds and in water conservation areas appear of very great importance, not only as a contribution towards the future timber supply, but as helping to maintain a more regular and a purer flow of water into the streams and rivers. The planting of trees for firewood and shade for stock on rough or poor portions of the farm was recommended. On most farms there were a few patches of land that produced very little and were hardly suitable for cultivation. Mr. Kelly advised protecting young sugar gums from frost by placing a few short boards round the young trees and mulching the ground immediately round with stones. The raising of trees from seed by the farmer was advised as likely to give better results than carting them, often in an exposed manner, long distances from the State nurseries. A shallow box sunk level with the surrounding ground provided a good seed bed.

Two Wells, March 25.

(Average annual rainfall, 16·64in.)

PRESENT.—Messrs. W. S. Cordon (chair), E. H. Green, A. Pratt, H. Kenner, H. Pederick, H. Goss, A. J. Baker, P. C. Cooper, L. H. Dawkins (Hon. Sec.), and two visitors.

PICKLING WHEAT.—A discussion on this subject was initiated by the Chairman, who was of the opinion that bluestone was the best solution for destroying smut in wheat. His practice was to use salt water for mixing the pickle, 4ozs. or 5ozs. of bluestone being used to the bag of wheat. There was more likelihood of smut developing when the seed was sown wet. Mr. A. Pratt also favored bluestone. Formalin, he thought, destroyed the germinating power of a greater percentage of the grains. [This is quite contrary to the general opinion.—Ed.] The pickling should be done two or three weeks before sowing. He sowed two plots side by side, one with pickled seed, and the other without. The former yielded a clean crop, whilst two thirds of the latter was affected with smut. Members generally agreed that it was advisable to pickle seed.

Two Wells, April 22.

(Average annual rainfall, 16·64in.)

PRESENT.—Messrs. W. S. Cordon (chair), A. Pratt, H. J. Wasley, A. J. Baker, P. C. Cooper, J. Rowe, J. Secomb, J. Williams, H. D. Secomb, H. Goss.

MOST SUITABLE WHEAT FOR DISTRICT.—Mr. Pratt mentioned that during the last 10 years he had tried about 19 different varieties of wheat, and had found that they yielded on an average fairly uniform returns. One exception, however, was Bunyip, which had not turned out so well. The general average during the last year was about 14bush. to the acre, the return for Bunyip being 9bush. Early varieties were best for hay. He had found King's Early, Gluyas, and Baroota the best early wheats for the district; but, as a general rule, the early wheats did not return such good quality grain as the later varieties. Members generally agreed that Baroota Wonder was the wheat most suitable for the district. Mr. J. Williams mentioned that Bunyip was an extremely quick-growing variety, maturing about 20 weeks after the time of sowing.

Watervale, March 3.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. E. E. Sobels (chair), O. Dunstan, P. Dunstan, A. Davis, F. Hamp, J. Hamp (Hon. Sec.), and one visitor.

QUESTION BOX.—Various matters of interest were discussed by members. It was mentioned that the excessive heat lately experienced would in all probability result in currants being scalded. It would therefore be advisable to allow them to remain in the stack slightly longer than usual before they were put out to dry. Mr. Pope thought the reason grapes fell off after rain was that the ground was insufficiently cultivated. The general opinion of members was that calves allowed to run with their mothers would mature more quickly than hand-reared animals. Some members, however, thought hand-reared cows were best for milk production. Mr. Pope attributed the scarcity in the supply of honey in this district to the dry autumn of 1912 and the unfavorable spring. The supply of pollen was poor, consequently colonies were weak, taking quite two months longer than usual to pick up. Heavy frosts experienced last October cut a large number of blossoms, and this also accounted in part for the shortage.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Bute, March 18.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. W. J. Hall (chair), A. Cousins, A. H. Schroeter, S. Trengove, W. H. Sharman, T. Kerin, J. Wauchope, M. McCormack, L. Simon, E. W. Bettess, and L. McCormack (Hon. Sec.).

COMPULSORY REGISTRATION OF STALLIONS.—In discussing this subject, Mr. S. Trengove considered that no horse owner should be compelled to seek the service of certified stallions. The present regulations governing examination were sufficiently drastic. Messrs. Simon, Hall, and Schroeter thought the proposal would result in a hindrance to the breeding of draught stock. Mr. Cousins pointed out that the chief grounds for rejection appeared to be side bone and ring bone, which, owing to the great weight of draught horses, were very prevalent. A fair judge of horse stock could detect these without the aid of a veterinary examination. Mr. Kerin thought breeders should be allowed to select sires for their stock without hindrance.

Bute, April 15.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. E. W. Bettess (chair), M. Stevens, A. Schroeter, H. Schroeter, J. H. Barnes, W. J. Hall, M. McCormack, F. W. G. Heinrich, W. Sharman, S. Trengove, L. E. Simon (acting Hon. Sec.).

PICKLING WHEAT.—Mr. S. Trengove recommended the use of $\frac{1}{4}$ lb. of bluestone to the bag of wheat when pickling seed. This effectually destroyed the smut spores and ensured a clean crop. The majority of members favored the use of bluestone, the most popular method being floor pickling, which ensured a more even wetting of the grain than dipping. Mr. Sharman reported that in a case where pickled and unpickled seed had been sown on one farm, the crop from the former was dirty with smut whilst that from the latter was free of the fungus. [It would be interesting to know all the conditions in this case. Was the unpickled seed sown in dry land? Were precautions taken to prevent reinfection of the pickled seed in the bags or drill? State-wide experience has demonstrated conclusively that pickling thoroughly with a carefully prepared solution and preventing reinfection by immersing bags in the pickle is a safe preventive of smut. If the unpickled seed is sown in dry land there may be enough moisture to germinate the fungus, but not the wheat, when the former will die for lack of a congenial host.—ED.]

Kadina, April 5.

(Average annual rainfall, 15½ in.)

PRESENT.—Messrs. J. Malcolm (chair), R. Correll, J. N. Pedler, F. R. Brinkworth, R. J. Rose (Hon. Sec.), and one visitor.

COMPULSORY REGISTRATION OF STALLIONS.—Mr. J. N. Pedler introduced a discussion. The question of compulsory registration of stallions and the issuing of licences, he said, was one which had for several years been discussed by owners and breeders. With the object of enforcing the principle in view the Government had decided that no subsidy should be granted to any agricultural society which did not insist that all stallions exhibited at its shows should have the certificate of soundness. This had not proved entirely satisfactory, as there was no legislation to prohibit service by stallions which failed to obtain the Government certificate. Since the regulation had been in force 509 stallions had been examined by the Government veterinary surgeons, and of that number 115 had been rejected as being unsound. These rejected stallions, however, were permitted to compete for service with those which had been passed as sound and free from defects. The chief ground upon which they had been rejected was the presence of side bone and ring bone. It was affirmed by authorities that these defects were transmitted from sires to their offspring. As the existing system did not prohibit stallions which failed to pass the Government examination from travelling, he was of the opinion that compulsory registration should be enforced, and that no stallion should be allowed to travel for service without being licensed. Another reform which was necessary was the compilation of a Commonwealth stud book which would contain reliable information concerning the breeding of all horses travelling for service. The proposal of Congress had been opposed by some on the grounds that it would be an interference with the liberty of horse owners and breeders. He, however, was of the opinion that it provided a protection which, in the interests of these men, was very desirable. Mr. R. Correll said the present position was unsatisfactory, as stallions which had not passed the veterinary examination were allowed to travel the country and serve mares, thus competing with animals which had passed the necessary tests. The farmer was satisfied with his own judgment on the desirability or otherwise of obtaining the services of stallions. There had been cases where a stallion which one veterinary surgeon had refused to pass had been passed by another. He did not consider that ringbone or sidebone of itself was sufficient grounds upon which to refuse a certificate to draught stallions. Some of the defects were not constitutional, but were due to causes such as overfeeding, overwork, or hard travelling, and these defects would not show in the progeny. Mr. A. Goodall failed to see the benefit of examination unless it was made compulsory, and only stallions which had passed the examination were allowed to travel for hire. Compulsory examination would result in the weeding out of inferior horses. Mr. F. R. Brinkworth could not see how anything could be done to improve the breed of horses if persons were permitted to keep stallions which failed to pass the necessary examination on their farms for the service of their own mares and those of their neighbors. Mr. R. J. Rose said that many farmers were of the opinion that some alleged defects, the presence of which prohibited certificates from being granted, were not transmitted from the sire to its progeny. When the certificate system was introduced it was considered that farmers would only engage the services of stallions to which certificates had been granted. This, however, had not followed. Farmers and horse owners put their practical knowledge and observation against that of the veterinary surgeon, and in effect said that stallions had been rejected because of defects which were not of vital importance. There was a lack of confidence on the part of some of the horse owners in the value of the Government certificate. He did not claim to be in a position to express an opinion as to which party was right, but until this was adjusted was confident that the Government certificate was of very little practical value.

Maitland, April 5.

(Average annual rainfall, 19½ in.)

PRESENT.—Messrs. Smith (chair), Bawden, Bentley, Darling, Hill, Jarrett, C. Pitcher (Hon. Sec.).

SOWING LUCERNE WITH WHEAT.—Members discussed at length the practice of sowing lucerne with wheat crops. Mr. Bentley had tried a few acres in the 1911 seeding with very satisfactory results. Two pounds or 3 lbs. of Hunter River seed were sown to the acre. Mr. Smith had also adopted the practice during the past five years, and noticed that the stock looked particularly well when running on lucerne, especially if they had

access to cocky chaff. At harvesting time it had been found that the lucerne was frequently as high as the wheat crop, but no difficulty was experienced with the stripper comb. Best results were secured from red sandy patches of land. He considered there was a tendency to sow too much lucerne seed. Members generally were of the opinion that it paid to put in a small quantity of lucerne seed with the wheat to provide summer fodder, more especially when summer rains were experienced. It was not likely to become a nuisance when working the land.

Minlaton, March 20.

(Average annual rainfall, 17in.)

PRESENT.—Messes. R. O. Page (chair), J. Martin, A. Washington, G. Correll, J. W. Griffith, W. McKenzie, D. M. S. Davies, R. H. McKenzie, S. Vanstone, J. Boundy, A. D. McKenzie, T. Giles, and J. McKenzie (Hon. Sec.).

TAINTS IN BUTTER.—Members discussed at length the subject of taints in both dairy and factory butters. In some cases the trouble was attributed to the mixing of fresh and stale cream. Other members thought that some herbs and bushes when eaten at certain periods of their development, tainted the milk. Algerian oats resulted in tainted butter when fed to dairy cows. All agreed that thorough cleanliness was essential in butter-making.

EXHIBITS.—The Hon. Secretary tabled samples of grapes and tomatoes which he had grown on his farm.

Minlaton, April 17.

(Average annual rainfall, 17in.)

PRESENT.—Messes. C. Parsons (chair), H. H. Evens, D. McKenzie, J. A. O'Brien, W. J. Griffith, R. H. Tilbrook, D. M. S. Davies, S. Vanstone, W. Bennetts, E. Correll, T. Giles, J. McKenzie (Hon. Sec.), and one visitor.

TREE-PLANTING.—Members generally agreed that the majority of varieties of gums could be successfully grown in this district. Mr. Griffith mentioned that when young gums in bamboos were being planted, the outside of the bamboo should be cut in order to allow the roots of the gum to penetrate it. Mr. Correll recommended planting seeds, covering these with bushes until the young trees came through. The chairman thought that where gum trees were planted, difficulty would be experienced in getting other vegetation to grow. Mr. Davies recommended ploughing or digging a trench alongside the trees to prevent the spreading of the roots.

Paskeville, April 20.

(Average annual rainfall, 15½in.)

PRESENT.—Messes. J. P. Pontifex (chair), T. H. Price, E. W. Bussenschutt, T. E. Eyleward, J. H. Bussenschutt, T. R. Brinkworth, W. G. Drewett, G. H. Baumann, A. Goodall, W. Rodda, J. H. Bussenschutt, F. H. Bussenschutt, S. R. Price, and T. M. Forbes (Hon. Sec.).

AUTUMN FALLOWING.—A paper on this subject was read by Mr. T. R. Brinkworth. This will be found printed on page 1153 of the current issue.

COMPULSORY REGISTRATION OF STALLIONS.—Mr. T. A. Price was of the opinion that until a uniform system of licensing was adopted throughout the various States compulsory registration of stallions would not effect the desired objective. Members were of the opinion that horses frequently showed signs of side bone or ring bone after reaching an age of three years or more without previously exhibiting any predisposition of this unsoundness. The case was mentioned of a horse buyer who had secured a colt in Melbourne which had been certificated sound, but in transit the animal met with a slight accident, resulting in it being condemned on examination in this State,

Yorkestown, April 12.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. W. Correll (chair), A. Jung, F. Modra, C. Domaschensz, R. Newbold, and J. V. Davey (Hon. Sec.).

CROSS-DRILLING AND SOWING LUCERNE WITH WHEAT.—In a paper on this subject the hon. secretary stated that experiments and experience generally showed the advisableness of applying heavier dressings of manure. Continuing, he said, "In order to secure early greenfeed for horses last year on the 19th of April I cross-drilled about three and a half acres of light fallow land with King's Red wheat. I drilled 40lbs. of seed and 100lbs. of super. each way. The crop came up rather patchy, but managed to survive the drought which prevailed through the following month. I had greenfeed to cut from it early in August, and cut most of the remainder for hay on the 26th September. I should estimate the yield of hay at quite 1½ tons per acre. The rest of my hay crop, sown alongside in May, yielded about 1 ton. As a wheat crop the piece would have been poor, as it went down badly, and the heads were very small. I attribute that to its being sown too early and forced too much, as King's Red usually yields best when sown late. I also cross-drilled 30 acres of Pryor's barley, using half a bushel of seed and 100lbs. of super. each way. The crop seemed to stand the dry weather very well, and yielded over 11 bags per acre. Of course, one cannot draw any definite conclusions from these cases, as there were no plots sown alongside for comparison; but I am of opinion that where it is desired to sow a heavy dressing of super, more good will result to the crop if the seed and manure are cross-drilled than if they are put in with a single drilling. I am also of opinion that for a hay crop cross-drilling with about 200lbs. of super. per acre will usually be found very profitable. Heavy manuring also has the effect of causing a crop to be more forward and to ripen a few days earlier than otherwise. I should like also to draw the attention of members to the practice of sowing lucerne with the wheat in a paddock which it is intended to leave out for grazing the following year. This seems to be growing in favor among farmers. The limestone soil in this district is well adapted to lucerne, and when once the plant gets a good hold it will thrive for years. It grows practically all the year round, as the frosts are not severe enough to check it in winter. It is not affected by takeall as far as my experience goes. It helps to keep the land clean, because it is strong-rooted and tends to starve the weeds out. I have noticed in the *Journal* that people speak of sowing 6lbs. or 8lbs. of seed per acre. I am at a loss to understand why such heavy seedings should be recommended. I have had very fair growths of lucerne following a sowing of from 1lb. to 1½lbs. per acre, the seed being broadcasted after the drilling and harrowed once. The plant is stronger and stands a dry spell better when not sown too thickly. If the lucerne seed is drilled in it is buried too deeply, and in that case a much thicker seeding is required, as many of the grains do not germinate. A good deal of the lucerne seed sold is unsuitable for sowing on account of being harvested too soon, having gone musty and turned a reddish color. My lucerne sowings last year gave poor results, mainly because the seed was poor, but also partly because of the season. I have, however, some lucerne which was sown two and three years ago and which is doing well, and I recommend every farmer to give it a trial." In the discussion which followed some members expressed doubt as to whether it would pay to use more than about 80lbs. of super. per acre, and also as to whether cross-drilling was practicable owing to the extra labor involved at a busy time. Others had seen the benefit of both heavy manuring and cross-drilling.

MARKET FOR BARLEY.—Among other subjects discussed were the doubtful prospects of the barley market for the coming season, and regret was expressed that there was not an export trade to steady prices, as farmers were often afraid to sow much barley as they might have difficulty in selling.

WESTERN DISTRICT.**Butler, April 21.**

(Average annual rainfall, 13 in.)

PRESENT.—Messrs. G. Young (chair), Tremberth, Phillis, R. Harrowfield, and D. B. Butler (Hon. Sec.).

BEST WHEATS FOR DISTRICT.—Mr. Phillis read a paper in which he stated that for eight years he had been growing Early Gluyas wheat. In 1910 he secured an average of 16 bush,

per acre from 36 acres. The average for the preceding year was 14bush. Bunyip, during the three years he had sown it, had averaged respectively 13bush., 12bush., and 7bush. to the acre. In order of preference he next placed King's Red and King's White. Late Gluyas promised to be a good wheat for the district, as during the present year it averaged 10bush. to the acre. He had also grown fair crops of Federation, Yandilla King, and Marshall's No. 3.

The hon. secretary also read a paper on this subject. When he first came to the district he thought it advisable to sow as much early wheat as could be handled at harvest time. His experience was that Yandilla King was the best variety for the district, whether sown late or early. When fed down it appeared to stool well. Feeding down was not advisable in the case of Gluyas, Federation, Comeback, or Steinwedel.

Colton, March 29.

(Average annual rainfall, 16in.)

PRESENT.—Messesrs. M. D. Konny (chair), P. T. Kenny, W. A. Barnes, R. Hull, E. R. Dubois, Geo. Lewis, Gerald Lewis, L. Larwood (Hon. Sec.), and one visitor.

PHOSPHORUS POISONING.—Mr. Dubois contributed an interesting paper, in which he detailed the experiences of a farmer who had five horses poisoned with phosphorus. The animals had gained access to a kerosine bucket containing oats mixed with sugar, hot water, and two sticks of phosphorus dissolved with the aid of bisulphide of carbon. Within two hours of the time the animals had taken the poison they were successfully treated with a drench consisting of 8 grains of sulphate of copper (bluestone) in half a pint of warm water given at intervals of 20 minutes, four doses being administered. This treatment abated the pain, and the drench was then alternated with 2 drachm doses of subnitrate of bismuth. When this treatment was commenced within two or three hours of the time the animals ate the phosphorus the copper salts rendered it insoluble and it was excreted without damage to the horse. The subnitrate of bismuth coated those parts of the lining of the stomach already affected by the phosphorus, and protected them from the gastric juices and the churning motion of the stomach. Members related a number of instances where poisoning from this cause had proved fatal.

Elbow Hill, March 22.

(Average annual rainfall, 11·78"n.)

PRESENT.—Messesrs. Cooper (chair), G. C. Dunn, P. C. Wake, H. Wheeler, E. Wake, F. Freeth, and G. F. Wake (Hon. Sec.).

THE LAST WHEAT SEASON.—Mr. G. F. Wake read a short paper, in which he mentioned that owing to the long dry spell which was experienced early-sown wheat last year was greatly handicapped by the presence of weeds. He ploughed 270 acres in a dry condition, but awaited a good fall of rain before sowing. He did not think it advisable to use more than 56lbs. or 65lbs. of super. to the acre, and when sowing for grain would not put in more than 50lbs. or 60lbs. of wheat, except of Gluyas. Mr. G. C. Dunn said light dressings of manure would in some seasons result in good returns, but usually this was not the case. Members generally agreed that early sowing was necessary in land abutting the sea coast. Sowing could be done in June in the hills.

Elbow Hill, April 19.

(Average annual rainfall, 11·78in.)

PRESENT.—Messesrs. W. T. Cooper (chair), F. Freeth, N. V. Wake, P. C., A. C., and E. R. Wake, A. Chilman, H. and F. Wheeler, T. F. Brooks, A. R. S. Ramsey, and two visitors.

SHEEP ON THE FARM.—This subject was dealt with in a paper by Mr. Freeth. While the Franklin Harbor district was not one of the best for wheat-growing, he said there was generally a good growth of feed which could well be utilised for sheep feed. Only young animals of good frame, with the prospect of returning a good wool clip should be selected. They should be frequently changed from paddock to paddock, and the water troughs should be well filled in the early morning. After shearing, the sheep could be put on to clear the fallows. Long-woolled sheep would carry large numbers of seeds, and a flock brought from a place likely to be troubled with weeds should be shut in a yard for

a while. The progeny of the Leicester, Shropshire, or Lincoln rams on Merino ewes would be found to do better than pure Merinos. The rams should be put in about December, in order that the lambing might be over before the advent of the cold weather. Mr. A. Chilman thought that if rabbits were kept in check in the district, the farmers would be able to keep twice as many sheep as they were keeping at present. He favored the pure Merino for this district, with which Mr. H. Wheeler agreed. Mr. E. Wake said it was necessary to provide small paddocks and frequent changes from one to the other if sheep were to pay. The chairman thought the demand for fat sheep would soon be overtaken by the supply in this district. Sheep required plenty of water.

FEEDING HORSES.—Members thought chaff and oats the best feed for farm horses. Forty pounds of chaff, with the addition of oats, constituted a fair daily ration for one horse.

Koppio, April 21.

(Average annual rainfall, 17in.)

PRESENT.—Messrs. R. Richardson (chair), R. F. Richardson, T. Brennaud, H. Thompson, G. Miller, G. B. Gardner, and T. R. Gardner (Hon. Sec.).

SEEDING OPERATIONS.—In a paper on this subject Mr. F. Richardson said it was advisable when fallowing to plough to a depth of 4in. This should be followed by frequent working, the land being disked about a month or six weeks after ploughing to kill the weeds. He would go over the land again about six weeks before seeding and put a strong tooth cultivator over it directly before the drill. This would leave the soil in good condition and provide a good seed bed. The seed grader was indispensable on the well-kept farm. He had used one for years and would not be without it. It was surprising what an amount of rubbish such as drake, cracked, small, and shrivelled grain was secured from a fair sample of wheat. He was convinced that this practice had resulted in an increased yield to him of between 1½ bush. to 2 bush. per acre. It was a good plan to pick out a few of the best heads in the crop, say, 20lbs. or 30lbs. to handthresh and winnow, and then sow them in a small plot. This should be repeated the following year, and eventually sufficient seed for the farm should be secured in this way. Members in discussing the subject thought that different types of soil required different systems of working. Some thought it advisable to leave the soil in a rough condition until near seed time, as otherwise there was a tendency for the land to set down hard with the heavy winter rains. Sandy, gravelly land with a clay subsoil was better when worked shallow.

Miltalie, March 22.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. P. G. Wilson (chair), J. P., J. W., and E. Story, Brine, J. Jacobs, W. G. Smith, A. M. and M. H. Wilson, C. E. Scarle, J. R. Hill, and T. A. Wilson (Hon. Sec.).

SEED WHEAT.—A short paper on this subject was read by Mr. Jacobs. In his opinion it was necessary to change seed frequently, as otherwise there was a tendency for it to degenerate. In discussing the subject members agreed that it was advisable to procure seed from a district with a smaller rainfall than that in which it was intended to sow. The best grains only should be sown. Mr. P. G. Wilson had sown plots of equal size with 40lbs. and 60lbs. of seed respectively. The former yielded 2 bush. per acre more than the latter. Members generally favored light sowing.

Petina, March 29.

(Average annual rainfall, 12½in.)

PRESENT.—Messrs. W. Ponna (chair), W. H. Howard, O. J. Howard, W. G. Lewis, and J. Souter (Hon. Sec.).

MOTIVE POWER ON THE FARM.—A paper was read by Mr. W. G. Lewis, the substance of which is given :—"The advent of the internal combustion engine has in some parts of the world revolutionised farming, but its use in South Australia is practically in its infancy. That this form of energy is to be the power of the future there is little doubt, and the man who wishes to become an up-to-date farmer, producing in the most economical manner, must study this question well. The term 'horse-power' does not mean that of

the animal, but is used as a mechanical unit of force or energy. This unit of power is the mechanical force necessary to lift 33,000lbs. 1ft. high in one minute. I will endeavor to give you in a simple and practical way some illustrations from which you may be able better to form an idea of the term used. In working a crane handle a man can apply a force of 60lbs. in an emergency with difficulty; a force of 30lbs. for a short time with difficulty; a force of 20lbs. for a short time easily; or a force of 15lbs. in continuous work at a velocity of 220ft. per minute; hence the power of a man is equal to $15 \times 220 = 3,300$ foot pounds per minute, or one-tenth of a horse-power. A strong horse can travel two and a half miles per hour and work eight hours a day, doing the equivalent of pulling a load of 150lbs. weight up out of a shaft by means of a rope. Two and a half miles an hour is 220ft. per minute, and at that speed the load of 150lbs. is raised vertically the same distance; that is, equal to 300lbs. raised 110ft. high, or 33,000lbs. raised 1ft. high per minute. That is the mechanical unit of one horse-power. In describing the power of an engine two terms are used, viz., indicated horse-power and brake horse-power. The former means the actual power developed to run the engine and perform its work. The latter means the effective horse-power or the indicated horse-power of an engine, minus the power absorbed by its own friction. It now becomes necessary for the farmer to consider how best he can substitute mechanical force for manual labor. For instance, a man could not haul from a well 20ft. deep more than an average of 200galls. of water per hour continuously for 10 hours. A one-half horse-power engine pump would do this work in one hour. Allowing wages to be equal to 1s. per hour, the cost would be 5s. per 1,000galls., while the engine power would not exceed 6d. per 1,000galls. in cost. A man using, say, 200galls. of water per day would require 73,000galls. per annum, and would lose £16 18s. 6d. by employing manual labor. This question of cost is of course the dominant factor on the farm, and I have already shown that manual labor used only as power is the most costly; in fact, it works out something like this:—Engine power, 3½d. to 4d. per horse-power per hour; the horse, 8d.; and the man, 10s. The difference is so great that the wonder is why, where otherwise possible, a man or even a horse is employed simply for mechanical force or power. Motor power should be utilised wherever possible. The greatest care must be exercised to see that the power is properly installed and applied, otherwise a failure may result where a decided success should be obtained." In discussing the subject Mr. O. J. Howard mentioned that in loose, sandy land a great deal of the power of tractors was spent in the draught of the engines themselves. Mr. Lewis said a three horse-power two cycle engine fixed on a harvester would do away with the crown wheel, and considerably lighten the work for the horses.

EXPERIMENTS ON THE FARM.—At a previous meeting this subject was dealt with in a paper by Mr. W. H. Howard. He suggested that tests should be made to provide definite data with regard to the benefits of early and late fallow and the advisableness of working the fallow before seedling. Information as to the value of early or late seedling and the quantities to be sown, and also the rates of manuring would be of practical interest. Wheat variety tests would prove a valuable guide, and experiences with regard to shoot destruction would be of considerable benefit. The native pine and king mallee were growing 2ft. and more in diameter in this district, and experiments with useful timber trees could profitably be undertaken. Similar steps could be taken with fruit trees and vegetables. The practicability of growing such cereals as barley should also be determined, and the publication of results of tests in the directions indicated should be productive of considerable good.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Borrika, April 22.

PRESENT.—MEMBERS. E. H. Huxtable (chair), R. J. Stephens, W. Mayfield, G. H. Collins, J. L. Sandercock, L. G. Huxtable, J. Woods, H. A. Weber, P. J. Marker, J. E. Coombe, A. E. Seary, G. L. Bonython, G. J. Weber, W. Willoughby, T. Wright, H. L. Green, L. G. Mansfield, W. V. Brown, C. W. B. Traeger (Hon. Sec.), and two visitors.

GROWING WHEAT IN THE MALLEE.—Mr. J. Waters, jun., dealt with this subject in a paper from which the following is taken:—"A good stubble burn kills a very large proportion of the small bushes and also weakens the mallee. The share plough destroys the roots of bushes and pulls out stumps, consequently there is not so much shoot-cutting to do. Of course the cultivator can be used with much less expense and labor which for one starting farming is of great importance. On sandy land in new country I would not plough deeper than about 3in., but in heavier land I would advise another inch or two. As it will absorb more of the rainfall the land will settle more firmly when ploughed early. I would wait until the first or second week in April before sowing and finish about the middle or end of May, although I have seen a good return from a crop sown in the last week of July. Gluyas has always yielded fairly well with me, but I would not advise sowing a large area of this variety as it is liable to go down, and also should rain come after it is ripe and before it is reaped it is very hard to thresh. Gravestock Frampton is also a good yielder, but it shakes out rather easily. These two are early wheats and do better when sown last. Marshall's No. 3 yields fairly well and is also hardy. Steinwedel and Gravestock mixed make a sweet hay, but it is very light, and when being carted on a warm day it breaks very badly. White Tuscan is a good wheat for hay; it weighs well and the horses are fond of it. Purple Straw is also fairly good. Some wheats are more likely to be affected with smut than others, and Gravestock Frampton and Steinwedel are amongst the worst. Gluyas is fairly free from this fungus. If there is rubbish in the seed very often there will be several feeders of the drill not distributing. I would not sow too thickly. For early sowing 40lbs. to the acre is, in my opinion, enough; but when sowing late, say, during June, I would sow thicker. Wheats that do not stool well, such as Gluyas, require to be sown thicker than wheats such as Purple Straw, White Tuscan, and Marshall's No. 3; 40lbs. to 60lbs. of super. per acre is generally sufficient, taking one season with another. I favor floor pickling. Half a pound of bluestone in about a gallon and a half to 2galls. of water is sufficient for 4bush. or 5bush. of wheat. Care should be taken not to place the wheat back in bags that have come in contact with the smut. I would pickle some time (say a week) before sowing. This would give the grain time to thoroughly dry and it would run through the drill more freely. Pickled wheat will not run as freely as unpickled.

SEEDING.—Mr. A. E. Seary read the following paper on this subject:—"To have land clean of sticks and rubbish before cultivating is begun is a great advantage. Every time a disc cultivator rises over a stick so much land remains uncultivated, and the drill, in going over rubbish, leaves seed and manure on the surface; often the seed does not germinate, or the birds get it before it has a chance. The ordinary four or five furrow plough is an implement we can well do without in this district for a few years. The lighter cultivating share ploughs with the spring draught are the best. This machine will effectively deal with the mass of roots which hang in the ground, and the moisture and the super. which these surface roots would utilize is left for the growing crop. By adjusting the pressure on the spring the number of stumps pulled out can be regulated to a certain extent. This class of implement, with discs in place of shares, will be found almost as useful. It leaves a good seed bed, almost too fine and level, for new land will sweeten better if left rough after the plough; the drill following will always smooth it over. Practically no stumps come out and it rolls over all rubbish. Another implement which seems to be popular here is the disc harrow. This can hardly be classed as a cultivator. In the lighter soils it will do useful work, especially if the land is gone over twice, turning half back each round. Four horses with one of these will cover 250 acres comfortably. This is a big consideration in a new country where all feed has to be purchased. As to the depth to cultivate opinions will always vary. If the shallowest part of the work has been stirred not less than 2in. this should be sufficient for the first year. In rough country it is impossible to work to an even depth, so to get the low parts down 2in. means some part of the cultivator will be cutting to a depth of 3in. or 4in. In good even country it is advisable to keep it in the ground to a depth of 2½in. to 3in. The stumps should be gathered in heaps in the paddocks and carted into the railway at any time when the horses are idle and consuming chaff. The profit will not be large, but in a new district these are the profits that count. Any disc drill is good with a good man behind it. This will be a fairly late district, and I favor early and midseason wheats for the main crop, with a small quantity of a late variety in case of accident by way of frost or hot winds. Forty-five pounds of clean, plump seed per acre is sufficient for midseason and late varieties and 60lbs. for early sorts. Forty pounds to 56lbs. of super. will be found about sufficient, judging by similar soils elsewhere. The better the scrub burn and the sooner the land is ploughed after the burn the less manure it will require. First of all a quick-growing early wheat should be sown for hay. It will do no harm to apply an extra 10lbs. of seed

to the acre and add a little sulphate of ammonia, about 15lbs. per acre, to encourage a stronger straw growth. Extra work clearing this hay ground is not misspent, for every inch closer to the ground the binder can cut so much more hay is gathered. It will be well to sow oats as a portion of the crop, cutting some for hay and stripping the remainder for horsefeed and seed for the following year. Forty pounds of oats, Algerian for preference, and the same amount of manure as for wheat, should prove satisfactory quantities to sow per acre. A few acres of Cape barley are very useful for greenfeed for stock when the seeding is over if sown early. Both barley and oats will grow a stronger stubble than wheat, which is an advantage when burning off after harvest. Care should be taken to see that the seed is all well covered by the drill, and if this is not being done satisfactorily trailers should be attached behind the discs of the drill. Bluestone solution is the favorite preventive for smut, and nothing else is as good. The accepted standard of strength is a 2 per cent. solution, i.e., 1lb. of bluestone to 5galls. of water. A bag of grain only loosely filled if dipped into a keg of bluestone solution of this strength will be sufficiently pickled within two minutes, or if left until such time as air bubbles cease to rise from the bag. In my opinion it is immaterial whether the grain is sown immediately after pickling or left for a week or more before it goes through the drill. Should the seed wheat show signs of being smutty, make the solution stronger. A rough and ready method of judging the strength is by the color, but it is a method by no means to be recommended. The harvest depends on which way the work is done. The rainfall only helps, and our business is to take care of it."

Clanfield, March 29.

PRESENT.—MRS. A. Richards (chair), H. Milne, A. E. Heaven, P. Nelson, W. D. Cowley, A. Orwell, L. Orwell, H. Pavy, A. E. Pavy, A. G. Franklin, L. G. Gilbertson, Wm. Queale (Hon. Sec.), and four visitors.

HARVEST RESULTS.—A general discussion took place on the harvest returns for the past season. The district being comparatively new, only two harvests having been gathered by most members, there was no land under fallow; but well-worked stubble land had given satisfactory results. Returns from new land in most instances were not so good. The season opened late, no soaking rain falling until the third week in June, consequently all the wheat had practically come up at the same time. Members had found that the early wheats, such as Gluyas and Golden Drop and midseason wheats such as Marshall's Hybrid and Federation had given the best results. Frost late in the season and hot winds had affected the yield to a certain extent, but it was realised that thorough fallowing would mitigate these evils by creating stronger and healthier plant growth. Oats had done well on sandy land, but the heavier land had not given such good results this season. The fire rake had proved itself to be a valuable adjunct to the equipment of the farmer on mallee land, and the effects of the stubble fire could be traced to a yard in the crop. Members were thoroughly satisfied that highly profitable results would follow the adoption of systematic farming methods.

Forster, February 22.

(Average annual rainfall, 10½ in.)

PRESENT.—MRS. C. Hayman (chair), J. G. and R. Whitfield, W. T. and J. Searle, W. Sears (Hon. Sec.), and one visitor.

MARKETING WHEAT.—In a paper on this subject Mr. C. Hayman said farmers could secure higher prices for wheat if they ceased storing their produce with merchants. There was too great a tendency on the part of the majority of farmers to rush their wheat on to the market immediately it was harvested, which had the effect of lowering prices. Members, in discussing this subject, agreed that as wheat prices were governed by a world-wide market, the idea of raising prices by the farmer holding his wheat was somewhat impracticable. Mr. J. Searle thought Dart's Imperial, Purple Straw, and Gluyas the three wheats most suitable for this district. Members generally favored Dart's Imperial, and Gravestock and Marshall's No. 3 were also mentioned.

Hooper, April 19.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. J. R. Beck (chair), T. Nicolle, H. Nicolle, C. S. Hall, J. W. Murphy, A. Hood, J. Boyce, R. J. Chenoweth, B. Chenoweth, F. Koster, and C. B. R. Wright (Hon. Sec.).

REGISTRATION OF STALLIONS.—The majority of members agreed that stallions should be registered, but it was thought that a certificate procured in one State should hold good in another.

RABBIT DESTRUCTION.—In a paper on this subject Mr. J. W. Murphy said that when the rabbits were not very plentiful they could be readily controlled by digging out or trapping. Where they were numerous the use of phosphorised pollard and the poison cart was advisable. In the absence of a poison cart, two furrows could be taken from an old three-furrow plough, a seat and a box being fixed on to it. The driver could then drop the baits at such places as he thought desirable. The best time to carry out this method of poisoning was just after a shower of rain. Strychnine mixed with sugar and flour or raspberry jam and spread on sandalwood twigs made an effective poison, the baited animals usually dying on the spot. Those that gathered around the wheat heaps could be destroyed by being supplied with poisoned water. The most suitable time for filling holes was during the summer months when the land was loose and dry. The hole should be dug out for a short distance and the ground around should then be dug and allowed to run into the hole. Very loose earth should be put in at first, and a mound at least 2ft. high should be left over the place where the hole was. Patches of scrub inside the paddocks harbored the rodents. Boundary fences should be netted, and a line of netting should be run through the centre of the block. Where the paddocks were restricted in area to 200 acres, systematic destruction of the pest could be carried out.

Monarto South, April 23.

PRESENT.—Messrs. G. Patterson (chair), A. P. Braendler, J. and H. Frahn, A. and R. Hartmann, B. Hoff, G. and R. Paeck, A. Schenscher, E. Tilbrook, B. Thiele, H. Zeunert, C. F. Altmann (Hon. Sec.), and one visitor.

PICKLING WHEAT.—In a paper on this subject Mr. R. Hartmann mentioned that pickling with bluestone was the cheapest and best method of ensuring absence of smut in wheat crops. He used between ½ lb. and ¾ lb. of bluestone to 2galls. of water, first crushing the bluestone and dissolving it in a small quantity of hot water, and then adding sufficient cold water to make up the 2galls. He then emptied two bags of wheat on a deal floor and sprinkled the pickle over it, turning the wheat with a shovel three or four times. The method of dipping a bag of wheat into the pickle was most unsatisfactory. Patent solutions were better left alone. Some varieties, such as Early Para and Golden Drop, would stand a stronger solution than was the case with varieties such as Yandilla King or Marshall's No. 3. If farmers secured clean seed and pickled it carefully they should experience no trouble with smut. In discussing the subject, Mr. A. Hartmann said it was advisable to test the bluestone as the quality frequently varied.

Monteith, April 19.

PRESENT.—Messrs. D. J. Travers (chair), Connell, Wells, J. Rowan, P. W. Gregory, J. Ferries (Hon. Sec.), and one visitor.

GRASSES.—Mr. J. Ferries tabled a number of grasses and other fodders. For sowing on light sandy soil he advocated Cocksfoot, Evening Primrose, Meadow Foxtail, *Oryzopsis miliaceum*, and Rhodes grass, the latter being especially suitable for sands liable to drift and a wonderful spreader. Mr. Rowan indorsed the Hon. J. Cowan's assertion that *Paspalum dilatatum* was becoming a noxious weed and should not be sown on the Murray reclaimed swamps. All members present emphatically condemned couch grass and deplored the fact that the ombankment of the swamp had been sown with it previous to settlement.

Morgan, March 29.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), E. Hausler, J. Pope, J. Heppner, H. Wohling, O. Hausler, and two visitors.

FENCING.—The Hon. Secretary read a short paper in which he stated that, wherever practicable, galvanized iron wire should be used for the top two wires of fences. Not only was this more durable, but there was less danger of stock being injured through running into it than was the case with the ordinary black wire. Messrs. H. Wohling and J. Heppner preferred to use black wire, but Messrs. E. Hausler, J. Pope, and the Chairman recommended galvanized wire.

Morgan, April 19.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. R. Wohling (chair), E. Hausler, H. Wohling, J. B. Hoffmann, and C. A. R. Wohling (Hon. Sec.).

PICKLING SEED WHEAT.—Mr. O. Hausler contributed a paper on this subject. After pointing out that smut was a fungus which depended for its subsistence after germination on a young wheat or similar plant, he said it could be successfully kept out of the crops by pickling. The method he adopted was to fix a pulley on a rafter in the barn over a cask to be filled with pickle, and into this, by means of a rope, lower the seed in a bag. The pickling solution should consist of 1oz. of bluestone and a little salt to a gallon of water; $\frac{1}{2}$ lb. of bluestone would be found sufficient for one bag of wheat. The grain should be left in the solution for a minute, and then placed in a sieve over the cask to drain. Care should be taken to thoroughly immerse the bags into which the grain was to be placed after pickling. The seed could be sown with perfect safety the day after treatment. Members generally agreed with the ideas expressed in the paper.

Parrakie, March 29.

PRESENT.—Messrs. F. J. Dayman (chair), A. J. Beelitz, F. Heinzl, R. F. Brinkley, F. W. Randall, F. W. Gravestocks, J. G. Temby, R. L. Beddome, J. P. Jose, L. Lewis, T. Willis, A. Heinzel, A. C. Hameister (Hon. Sec.), and three visitors.

SAND IN HORSES.—Mr. Beelitz had used oil of bergamot and carbonate of soda as a first-aid treatment for horses affected with sand. When brought in from grass to do hard work they should be given a bran mash containing a tablespoonful of washing soda, liquified with water.

BARLEY AND OATS.—Mr. Temby suggested sowing oats where trouble was experienced with takeall. Other members would put in as much as one-third of their cropping area with this cereal as it usually provided a good stubble for burning. It was thought that barley drew too heavily on the resources of the soil, and there was always the difficulty of it appearing in subsequent crops of other cereals.

Pinnaroo, March 20.

PRESENT.—Messrs. B. L. Harfield (chair), F. Laycock, F. H. and P. J. Edwards, W. and H. Venning, A. W. Burman, W. Wilson, G. Fuller.

HOW TO BUILD UP A DAIRY HERD.—Mr. B. L. Harfield read the following paper on this subject:—"In presenting this paper I wish to express my indebtedness to various writers for much of the information contained herein. Facts gained from those sources, combined with some practical experience, have prompted me to deal with this subject. The greatest question that faces the dairyman of to-day is this—Is it possible to reduce the cost of manufacture and marketing so as to obtain better net results for the producer; or can he produce more at present cost? Saving in some directions may be effected, but it will not, when all is accomplished, amount to much per head per cow. On the other hand, the production may, by skill and judicious management, be added to by at least 33 $\frac{1}{3}$ per cent. This may appear a bold statement, but it can be brought about, and would establish the industry on a permanent and satisfactory basis. Not

only would it add to individual returns, but any such increase would reduce the manufacturing cost of a pound of commercial butter at least 20 per cent. to 25 per cent. It can only be accomplished by the dairyman applying to his work those principles which make for success in every department and profession of life.

"The Possibility of Improvement."—If we strike a fair average, is it below the mark to say that cows in this State are producing only 180 lbs. of butter fat per season? The value of this at 10d. per pound (a very liberal average price) would give £7 10s. per cow for the season's milk. Is that a compensating return for the labor? There is no profit in such cows. The thoughtful man will admit that while we possess many cows that are good, the proportion of those that are not paying for labor and food is far too great. Physical strength and muscle are not the only capital which spell success. We are face to face with the necessity of imparting knowledge on agricultural matters to children. The majority of such who attend country schools live in an environment of agriculture. If they were given some knowledge of those elementary principles which form the foundation of natural results they come in contact with day by day, more good would ensue than from a close adherence to the present State school curriculum. It is not possible to teach all the elements of practical agriculture, but many things may be taught with advantage. Few men succeed in any calling unless their heart is in the work. Unfortunately, many of our dairymen are in the business to-day, not because they like it, but because it is a means to an end. Hence we find failure where there should be success. Did they but understand the fundamental principles upon which their work rests, every farmer worthy of the name would seek to have the best crops, the best herds, the tidiest farm, and the best quality of milk procurable.

"Causes of Unprofitableness."—Let us consider why so large a percentage of our dairy cows are unprofitable. It is due in a measure to the fact that most farmers, in order to complete their herds up to the maximum carrying capacity of their farms, have brought under contribution every heifer that would come into profit. Selection and culling have, therefore, through force of circumstances, been neglected. A large percentage of the cows used for dairying purposes are not adapted for the fulfilment of the conditions for which they are kept in consequence of the use of sires that are mongrels, or are not capable of producing milkers. Many never have the opportunity, through want of proper treatment, such as the care and education of the heifer, which will be referred to later on, and, being underfed and neglected, fail to develop their best milking qualities.

"Types of Cows."—It is impossible for a cow to be a first-class beef animal and the highest type of and most profitable dairy cow. The requisite functions, widely different, continually war against each other. It is a true saying that no man can serve two masters. If you want the milkpail to pay its utmost, go for the animal that will put the best quality and the greatest quantity into it, irrespective of any other consideration. If you want beef, go for the elements that produce it in the quickest time, at least cost, and of finest quality. The sooner dairymen get rid of the notion that a dual purpose cow is the proper ideal and turn their attention to a 'special purpose cow' that will give excellent results from year to year, the better. A good cow must be long, level, and loose jointed, with a capacious body, short fine legs, long light neck, clean cut and intelligent head, thin withers, deep flank, thin flat thighs, and rich *soft* mellow skin, showing a deep orange-color under any white markings, and on the inside of the ear and at the end of the tail. As viewed from the side she must present a perfect wedge-shape, exceedingly deep behind, and very light in front; and, as viewed from behind, she must show ample room to carry a large full udder with ease and without chafing. No cow can do this that is of a 'beefy' conformation and has not a good 'arch.' The udder itself must be soft and silky, free from warts and from long coarse hair. It must extend well forward and reach well up behind, having nothing of a globular shape. It must be square, level beneath, and not too deeply quartered, with teats of good size, evenly placed, very far apart both ways, and of uniform size. The udder must be very large and handsome when full, and when empty must be loose and soft, the rear part lying in folds—in fact, as the saying goes, it should almost 'milk out to nothing.' Such an udder is capable of great distention without discomfort to the animal, and adds wonderfully, not only to the appearance but to the intrinsic value of the dairy cow. The milk veins should be exceedingly large and crooked, and the milk yielded easily and evenly all round. Avoid a cow very tough and hard to milk. She is a continual nuisance. Avoid a very thick-skinned cow, whose hide is inclined to stick to her, or, on the other hand, one whose hide is too thin and paper-like, indicating delicacy of constitution. In an animal that 'handles well' there is a peculiar loose, soft, velvety touch that is learnt by experience, and without which no animal can be really thrifty. To be profitable to her owner a dairy cow should never list lower than 3.5 per cent. butter fat. If, with all these good qualities, you get a cow

that is young, healthy, with a soft silky coat of hair, and one with a gentle placid temper, you may be assured that you have made the first step on the road to success, even if she has cost you a little more than your neighbor had paid for an indifferent cow.

"Feeding and Shelter.—In a climate such as ours it is hardly necessary to stall feed the cows in the manner advocated in colder countries, yet there are one or two points which must not be overlooked. The cow is a machine to manufacture green and succulent forms of fodder into milk. The machine requires a certain amount to keep it in perfect working order; the amount consumed and so converted over and above what is required for her own support is your profit. Where cattle gather their own food from the soil on which it grows, we should see that the supply of nourishment is ample during the period of lactation, and above all things guard against overstocking. Better provision should be made for winter and early spring feeding. It pays to winter dairy stock well. How can it be expected that cows beginning a winter season low in condition, carrying a calf five or six months old which has to be nourished and matured until it is dropped, can do well in early spring? It takes frequently two months of the latter period of the year before they recover normal condition. With a plentiful supply of hay and such fodders and root crops as may be grown in the district, and the cows warmly rugged, they should be at their best in the early spring to begin their work of production. Another point which has not received proper consideration is the provision of shelter in the paddocks. The bitterness of the night winds could be much tempered by the shelter of suitable plantations.

"The Bull."—In a good dairy the bull is the important factor. This is very frequently ignored. Very often the dairyman invests 15s. or 30s. in a bull for the cowing season, and in many cases the progeny of these mongrels are being milked to-day, and men wonder why their milk supply is inferior both in quality and in quantity. The breeding of a good animal should be a delight to a lover of stock. To some men it is an intuition which animals to mate to produce a certain type of stock, but there are others who never attain success because they never try. It is generally stated that 'the bull is half the herd.' In practice this is not true. He stands in relation to the whole in a *greater* ratio than one-half. Therefore it is of the utmost importance that only good specimens should be allowed to propagate their species. The bull should be pure bred; because of a long line of clean ancestry his breed characteristics are permanently fixed, and these may be relied on to be reproduced in his progeny. On the other hand, a crossbred bull is one of the products of Nature, and the invariable rule is he will throw nothing as good as himself, but will reproduce the defects and shortcomings of his ancestors. The bull must be of a determined airy type, full of nervous energy, so that he will impress upon his heifers the quality of the dams that are behind him; well-formed and well-grown, of good color and constitution, and vigorous. See that he comes of a good milking strain, especially on the dam's side. If any material improvement is to be brought about, one of the first steps must be in the direction of using pure-bred sires only.

"Testing."—With the aid of the Babcock test and a pair of scales there is no reason why dairy farmers should not know the actual worth of every cow. At present they are completely in the dark. Not only do they not know what each cow is worth, but without this knowledge they cannot go in for intelligent breeding. Knowing with certainty that one has some cows that will show a good butter record, and a bull from a choice butter-making family, one can rear some heifers that will be a credit. Testing alone will discover the duffers, which should be passed out of the herd at once. A sufficiently reliable test can be obtained by taking a test twice a month, equal quantities being taken for a week from the morning and evening milking for, say, a period of eight months, or during such time as the cow is in milk. A daily record of the milk weight must be kept, and with the help of the fortnightly tests the results will be accurately known. The average farmer dreads to undertake this work, because of its apparent vastness; but it is a fact that without the application of this test there is but a very poor prospect of improving our dairy herds. Six years ago a New Zealand farmer started testing his dairy herd. In the first season of testing the cows averaged 198lbs. of butter fat. As a result of weeding out the worst cows the average for the second season was 222lbs.; for the third season, 234lbs.; for the fourth, 241lbs.; in the fifth season the yield was affected by a dry summer and consequent scarcity of feed; in the sixth season the average was 261lbs. Six years' testing thus increased the yield by 63lbs. of butter fat per cow.

"Education of the Cow."—Many cows never have the opportunity, through want of proper treatment, to develop their best milking abilities. To make a first-class dairy cow let the heifer calve in the autumn, milk through the winter, giving her plenty of nutritious food, then, when the early grass becomes plentiful, she will come back to full profit, and will milk on to the end of the season, a period of 12 or 14 months. By following this plan during the first milking period you will educate the cow to her business in life,

and establish or fix the habit of milking as long as you like. If they are allowed to go dry too early in the first year of milking, they will do it the second year, and so form the habit. The writer has not sought to advocate the claims of any particular breed of cattle, because that was not the intention of the paper, but to lay down general principles which ought to be followed. A farmer of ordinary intelligence taking a herd of average cows and following the principle of closely breeding from a pure-bred sire from some recognised dairying strain, together with constant testing, at the end of five or six years will have built up a dairy herd that will give a good account of itself, and will be a source of pleasure and profit to the owner." Mr. Ledger agreed with the paper in the main, but took exception to the statement that a dairy cow could not be a good beef animal and a good milker also. He knew of several cows which combined both these qualities. Mr. W. Venning agreed with Mr. Ledger, and thought it a good idea to keep an animal which could be turned into beef when of no further use in the dairy. Mr. F. H. Edwards said that, although there was a good deal to be said in favor of the utility cow, he agreed with the writer.

Sutherlands. March 22.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. J. B. Thiele (chair), Heusler, Noack, Twartz (Hon. Sec.), and three visitors.

IMPROVED FARMING METHODS.—Mr. J. B. Thiele read a short paper, in which he emphasized the necessity for careful cultivation of land, especially in those areas where the rainfall was limited. Since he had adopted the plan of thoroughly working his soil he had not experienced a failure with his crops. Last year, which had been one of the driest seasons on record, his average wheat return was 9bush. The selection of varieties suitable to the conditions was an important factor. He sowed four wheats last year, and they returned respectively—Federation, 7bush.; Viking, 12bush.; King's Rod, 10bush., and Hardy's Elation, 10bush. He fallowed the land in June and July, and put the harrows over it about six times; 58lbs. of seed was drilled in with 30lbs. of mineral super. per acre. Members generally agreed that Bunyip and Gluyas were good wheats for this district.

Tintinara, March 29.

(Average annual rainfall, 19in.)

PRESENT.—Messrs. J. Donaldson (chair), C. M. Ives, J. Helling, Bell (2), D. T. Kennedy, R. K. Henderson, E. B. Northcott, Stead (2), C. P. Hodge, A. Koepfen Wendt, M. Scott, J. E. Taylor, B. Taylor, A. J. Drvden, M. F. Hodge (Hon. Sec.), and four visitors.

FENCING.—Mr. E. B. Northcott, who read a paper on this subject, advised ploughing the land to a width of at least 3ft. on either side of the line of the proposed fence. Posts should be about 5ft. 2in. in length, and put in 12ft. apart to a depth of 18in. The first wire should be 7in. from the ground, the subsequent wires being 5½in., 5½in., 6in., 8in., and 11in. apart respectively: this would bring the last wire, which should be barbed, to the top of the posts. Galvanised wire was best. Straining posts should be 7ft. 6in. long, of well-matured timber, with 3ft. 6in. buried where they were at the corners or ends of the fence. Straining posts in the fence line need not be put in the ground more than 2ft. 6in., at intervals of 90yds. Where rabbits were troublesome, 3ft. wire netting of 1½in. mesh should be hung from a wire 2ft. 9in. from the ground, 3in. of the netting being buried. A 5ft. fence would be required to keep out the dogs. In this case the ordinary posts should be 6ft. 9in. long, and the strainers 9ft. 5in. being placed 3in. and 6in. further in the ground respectively.

POULTRY ON THE FARM.—This subject was dealt with in a paper by Mr. R. K. Henderson, who believed that the farmer could secure good returns from poultry as he had all the required food on the spot. There was food round the haystacks which would otherwise be wasted, and when the birds were allowed to wander at large there were grubs and worms which they would pick up in the paddocks. When laying hens were allowed freedom they were much healthier. Cockerels would fatten much more quickly when they were kept to themselves. White Leghorns were excellent laying birds, but they were practically useless for table purposes; therefore, the heavier breeds were more suitable for the farmer. Personally, he favored the Silver Wyandottes. Ducks did well in this district. With good treatment they would fatten in 10 or 11 weeks, and good prices could usually be obtained for them. Turkeys might be tried with profit,

although they required more attention than fowls and ducks. It was useless to expect hens to lay well unless they were provided with good housing accommodation to protect them during the cold nights.

Waikerie, March 17.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. F. G. Rogers (chair), R. Stanley, E. J. Burton, C. Promnitz, G. Jackman, W. J. Green, A. Lewis, J. J. Odgers (Hon. Sec.).

MANURING FRUIT TREES.—In a discussion on this subject Mr. Green stated his experiences in manuring peach and apricot trees and vines. He had applied stable manure to apricot trees and these were now green, whilst others not so treated had a yellow appearance. He believed in sowing peas between the trees early, and ploughing them under when in flower in July. He had applied 7cwt. of horticultural manure per acre to his peach trees, 5cwt. per acre to his apricot trees, and 4cwt. of vineyard manure to his vines. He scattered the manure broadcast for the trees, but ploughed in the vineyard manure first after the leaves had fallen and again at the first irrigation. The cost of the manure was £16 18s. and he obtained 2 tons 7cwt. of dried apricots from 130 trees, 7½cwt. of dried peaches from 24 trees, 5 tons raisins, 1 ton currants, and 7½cwt. of sultanas from about six acres. Mr. Rogers distributed stable manure thickly round his apricot trees, digging it in and allowing it to rot. The benefit derived was most noticeable the following year. Mr. Stanley stated that several trees near his house received plenty of potash in the shape of wood ashes, and these gave the best returns. The fruit from one tree weighed 425lbs.

Waikerie, April 21.

(Average annual rainfall, 9in.)

PRESENT.—Messrs. F. G. Rogers (chair), R. Stanley, J. Jones, J. C. Rowe, W. J. Green, E. J. Burton, G. Jackman, and J. J. Rogers (Hon. Sec.).

MANURING FRUIT TREES.—Mr. Rowe reported that some lemon trees in his garden had, up till two years ago, presented a yellow appearance. He had lately, however, made a practice of supplying them with wood ashes daily, and they had, during the past two seasons, yielded excellent crops of fruit and were quite green.

PRUNING VINES.—Referring to the pruning of the Zante currant, Mr. Green said there was no definite time which could be laid down as the best to begin this work. During the first year he would not prune the young vine, being content with cutting it back when planting. The second year he would cut it back to two eyes. Thick rods would be found unsuitable for fruit wood, the average size cane appearing to yield better. There was less likelihood of the top bud dying when the cutting was through a node. As the Zante was very subject to mildew it was necessary to limit the amount of foliage and wood. Mr. Rogers mentioned that in Renmark he had seen overhead trellises on which the secondary arms of vines ten years of age were being used. Younger vines, however, were spur pruned. The method adopted was to take a rod up to the bottom wire and then cut it back to about 2ft. or 2ft. 6in. in length. The two following years it was pruned to an under bud. With the fourth year a bud was taken from the top and carried along the top wire. The bottom was kept clear and spurs were worked about 8in. to 1ft. apart.

Wilkawatt, April 19.

PRESENT.—Messrs. D. F. Bowman (chair), W. J. and D. Bowman, jun., E. W. and H. Brooker, A. V. and J. Ivett, A. J. McAvaney, F. and B. Spackman, W. R. and M. Neville, F. W. Altus, P. Maber, B. Tylor, P. Gregurke, W. J. Tylor (Hon. Sec.), and one visitor.

FARM HOMESTEAD.—In a paper dealing with the erection of a homestead in new country, Mr. D. F. Bowman said he preferred a rise near the centre of the block and facing a road as a site. It should be as handy to tall mallee or pine as was possible under the circumstances, and loose sand should be avoided. About 10 acres would be required, as it was unadvisable to have the stables, sheds, &c., too close together or too near the house. A thatched roof was the most suitable for a stable, and the back and ends should be closed. Iron roofs would be found best for implement sheds, and it was not necessary to enclose

the back or the front. A bore should be put down on the highest point of the homestead, in order that water might be run to the different parts by means of gravitation, and all buildings so far as possible should face the east.

TREATMENT OF SANDHILLS.—This subject was dealt with in a paper by the Hon. Secretary, who mentioned that the sandhills of a white and very loose nature in this district had been found to return poor crops, which in the majority of cases were affected with takeall. The method of treatment he advocated in the case of a crop that had been badly affected by takeall was as follows:—The sand should be gone over lightly with a disc cultivator, which implement did not bring to the surface sour sand, as was the case with the mould-board plough. It also killed most of the rubbish that grew on the rises. About 1 bush. of oats and as heavy a dressing of super. as could be afforded under the circumstances should be drilled in. The land should be left out during the following year until September, and then fallowed when in as wet a condition as possible with a mouldboard plough to a depth of 5 in. or 6 in. This should be left until seed time, when 30 lbs. of wheat to the acre and a heavy dressing of super. should be applied. This method should be followed during succeeding seasons. While the crop would no doubt be somewhat dirty, the harvest results would in all probability be much heavier. When the land had become clear of shoots the stubble should be ploughed in. In discussing the subject, various methods of treatment of this class of land were suggested by members, one advocating dressing the land heavily with stable manure, others recommending ploughing in green feed.

SOUTH AND HILLS DISTRICT.

Blackwood, April 14.

(Average annual rainfall, 27½ in.)

PRESENT.—Messrs. W. L. Summers (chair), T. C. A., A. W., and A. A. Magarey, Wilson, Fennell, P. H. Williams, Conlon, Penno, G. W. Summers, H. Sullivan, Gamble, Nootnagel, Eglinton, Scherer, McNamara, Porter, Savage (Hon. Sec.), and two visitors.

THE FRUIT-GROWING INDUSTRY IN TASMANIA AND VICTORIA.—A paper on this subject was read by Mr. W. L. Summers. Dealing with the Island State first, he said it was queer, when travelling with experienced men, to hear repeatedly, "Oh, that land is fit only for apples." Another common observation was, "Plant apples on poor land, with a good subsoil; on good land the trees grow plenty of wood but produce little fruit." A large proportion of the orchards in Tasmania were planted on what in South Australia would be classed as indifferent soils—light loams to apparently poor sandy soils over a clay subsoil. He believed that the average apple yield per acre in Tasmania was nearly 50 per cent. greater than that in the central State. Between 350 bush. and 400 bush. an acre was considered a good average crop from established trees. One grower he visited had a block of 100 Jonathans, which, during the last five years, had yielded 600 to 1,400 cases annually. Another, from a 10-acre orchard, had sold 8,000 cases of export apples in a season. The Jonathan trees were pruned on a system he had never previously heard of. All of the fruit was borne within 6 ft. of the ground. Statistics showed that of the 26,000 acres of apples in Tasmania between 10,000 and 12,000 carried trees more than eight years old. The total crop last year exceeded 2,000,000 bush. He compared those figures with South Australia's total of 9,520 acres, of which 6,180 were in bearing, and a crop last year of 583,860 bush. Climate was one reason for the difference. The Tasmanian climate, more even and cooler than that in South Australia, tended to more regular cropping and heavier crops. The selection of varieties particularly adapted to the climate and soils, however, was probably a far more potent factor in securing the heavier yields. The visitor could not but be struck by the limited number of varieties growing in the majority of the orchards, and also by the fact that the varieties differed in the different districts. That was where South Australian growers had much to learn. The Sturmer Pippin was the most extensively cultivated, and probably the most profitable. Possibly the Cleopatra (New York Pippin) ranked next. Among other varieties planted on a large scale, and which did well, were Jonathan, Cox's Orange Pippin, Scarlet Nonpareil, and French Crab. He believed that specialising in varieties suited to the soil and climate in the various localities was essential to the production of maximum crops

and the ensuring of the highest quality. Speaking generally, the trees on the so-called poor soils were relatively small, symmetrical, and closely spurred from top to bottom. On the heavier soils a different system of training was adopted. He had seen thousands of Cleopatra and Jonathan trees which in shape and appearance, so far as the main leaders at from three to five years old were concerned, were almost identical with what he had in his own orchard a few years ago. The system of pruning was much the same, but the results were vastly different, due, he considered, to the difference in the soils and climatic conditions. As a result of hard pruning of the leaders and summer pruning the laterals, his young trees grew strongly, but produced little fruit. In Tasmania, on the other hand, they got short spurs and fruit right to the main arms. He had come to the conclusion, after two visits to Tasmania, that few people in South Australia knew what good orchard land was really worth. Thousands of acres of heavily-timbered land was being sold in Tasmania for apple-growing at £20 to £30 an acre, and clearing cost up to £40 an acre. Further, the land often was on steep hillsides, which must make working expensive. Three and four year old orchards were being purchased at £90 an acre, and those in full bearing brought £150, and even more. In South Australia there were thousands of acres of equally suitable land with a good rainfall within 25 miles of Adelaide. Generally the average cost of clearing would be little more than half that in Tasmania, and the land could be more easily worked; yet it was utilised merely for grazing or hay. He believed 1,000 acres of that land could be brought into full bearing for the same cost incurred by many Tasmanians in buying and preparing their land for planting. From some points of view Tasmania was fortunate in having such a firm as Messrs. H. Jones and Co. For jam-making and other purposes that firm was prepared to contract for the whole output of the orchard in certain lines of fruit, for a period of years, at prices decidedly above the average paid in this State by jam-makers. Dealing with fruit-growing in Victoria, Mr. Summers said probably the largest fruit-producing district in Australia was at Doncaster. There was about 7,000 acres under cultivation within five miles of the township. Growers had splendid markets, as Melbourne was only 11 miles distant, and the best market in Australia—Sydney—was but two days off. The result was that local rather than oversea requirements were catered for. The climatic conditions generally appeared similar to those at Blackwood, except that at Doncaster the gardens were more exposed to north winds and more subject to spring frosts. There, as elsewhere, was apparent a steady increase in the area under trees. Growers in South Australia could learn much from the methods adopted at Doncaster. In the first place on nearly every orchard property the *Pinus insignis*, or Romarkable pine, had been planted to form windbreaks. These trees stood in single or double rows within 15ft. or 20ft. of the fruit trees. In a number of instances he saw fruit trees within 20ft. of the inner row of pines, which were well over 30ft. high, but a close examination did not disclose that the fruit trees suffered from the contiguity of the pines. A progressive grower expressed the opinion that the pines, when planted close together, sent their roots down instead of along the surface, and that as the fruit trees were occasionally irrigated during the summer they were enabled to withstand any ill effects that otherwise might ensue. When double rows were desired the pines were planted 16ft. to 24ft. apart, with from 6ft. to 8ft. between the rows. When a single row was required they were placed 10ft. to 16ft. apart. The general practice was to plant the pines in the same year, or later than the fruit trees. Where fruit trees had been planted near established pines those within 30ft. of the latter had made little growth. There could be no question of the immense value of these windbreaks. Another noteworthy feature of the Doncaster district was the utilisation of the surplus waters for irrigation. In nearly every orchard there were hillside dams fed from the small creeks and from the roadsides. It was not unusual to find three or more such dams on a single holding. Where necessary the water was pumped from lower dams, which were easily filled, to others commanding higher parts of the orchards. The dams varied in size and cost, but £40 was considered reasonable for a dam to hold half a million gallons. The water was used to irrigate those trees carrying heavy crops, and in a dry summer two waterings were sufficient. Five hundred gallons applied to a heavily-laden tree had a marked influence on the yield and quality, so that a dam which cost £40 to £50 would suffice to water 800 to 1,000 trees. Growers in South Australia certainly failed to make the best use of their opportunities in the direction of water conservation and irrigation. A further point of interest was the use of cold storage for fruit. At Doncaster the Victorian Government had erected a large cool store, and so successful had it been that there now were four or five private stores in the district, besides a number in other parts of the State. The charge at the Government store was 1½d. a case per week, from January 1st to May 31st, and 1d. a case per week for the remainder of the year. The benefit of such a store to the growers was incalculable. Instead of rushing the fruit to town as it ripened, irrespective of whether the market was

glutted or not, they would, with such facilities at Blackwood, for example, be able to put their fruit into the cool store for 10 or 12 days. That would cost 3d. a case, but instead of having to take "jam prices" they would get steady rates. In Victoria the larger orchardists had cool stores of their own, and would not now be without them. A store to hold about 3,500 cases would cost approximately £1,100 to construct, and could be run by any person accustomed to machinery.

Clarendon, April 21.

(Average annual rainfall, 33jin.)

PRESENT.—**MESSRS.** A. L. Morphett (chair), W. B. Burpee, A. Harper, H. C. Harper, J. Spencer, J. Piggott, A. A. Harper, H. Tester, T. B. Brooks, J. R. Nicolle, F. Sheidow, C. Matthews, and A. Phelps (Hon. Sec.).

SHEEP ON THE FARM.—Mr. H. C. Harper read a paper on this subject. Having decided on which particular breed of sheep he would keep, the farmer, he said, should procure the best of that class. He favored the well-grown pure Merino from the northern districts, as they were usually larger in the frame than those from the south. With care it was possible to secure 9s. or 10s. worth of wool in addition to the lambs, and there was the further advantage that the sheep cleaned the land of weeds. They could also be utilised for the purpose of feeding down early crops that showed rather too strong growth, and this practice frequently resulted in a heavy return of hay. Careful attention to the sheep was essential, and the farmer would find it payable to dip them regularly. This class of stock fattened rapidly on peas; but he could not say whether it would pay to grow this crop for the purpose. After the animals had reached an age of five or six years, they depreciated rapidly in value, and it would not pay to keep them. In discussing the subject, some members expressed an opinion in favor of the crossbred sheep as being better able to stand the cold weather experienced in the district.

Forest Range, March 31.

(Average annual rainfall, 36in.)

PRESENT.—**MESSRS.** W. McLaren (chair), J. Vickers, H. Schultz, R. Collins, F. Rowley, H. Trevenen, E. J. Green (Hon. Sec.), and one visitor.

MANURING APPLE TREES.—The following paper was read by Mr. Vickers:—"It is a debatable subject amongst orchardists whether apple trees require manure. Some say they do not, and in support of their contention will cite instances of trees in Europe 100 years old, which have never been manured and are still bearing good crops, and they also instance trees in this colony fully half that age doing likewise. Trees of some vigorous varieties situated in a rich river flat, or some such favored locality, do bear crops spasmodically, but that does not prove they would not bear better and more uniform crops under a judicious system of manuring. Some, also, will tell us that they have manured and have not secured a reasonable return for their trouble and expense, and I feel certain that the chief cause of trees failing to respond to treatment is that the manure is not got down to the roots. If a cherry tree is given a few pounds of bonedust or super, the effect is very marked, while the same treatment to an apple tree will result in a good crop of weeds but very little benefit to the tree. If the manure were applied to the roots of the apple tree it would respond just as quickly. The reason we have more success in manuring cherries is that they are generally planted on nice loamy hillides, with a loose subsoil, and are never worked with the plough on account of their gumming propensities. The continual tilling with the fork or pronged hoe keeps the soil loose down to the lower roots, and the heavy rainfall takes the manure there. On the other hand apple orchards very often have a very stiff clay subsoil from the start, and then are ploughed once and often twice in the year, usually to about the same depth, i.e., 3in. or 4in., consequently the ground gets what the farmers call 'hard pan,' and it is difficult to get the manure down where it is wanted. It simply causes the top roots to throw out a lot of fibre which is promptly cut off by the plough the following spring. The rank growth of weeds, also, is often allowed to dry off, or is cut for the cows. When an apple tree 12 years old or upwards requires manure I would suggest putting down with a crowbar about four holes 6ft. from the trunk of the tree about equal distances apart and exploding a plug of dynamite in each. This will give the subsoil a good shaking up, and if done in the late autumn, should allow a soluble manure, such as potash or sulphate of ammonia, to do some good. I have found the latter the best manure for trees that have stopped growing. Applications

should be given early in the season, say in July or August, and the resulting rank growth ploughed under early in November in this district, otherwise the full benefit of the dressing is not secured." In discussing the subject Mr. Schultz advocated the use of stable manure for apple trees. Hard pans could be largely avoided by cross-ploughing. Mr. McLaren would not manure apple trees unless they stopped growing. The Hon. Secretary would not manure varieties susceptible to bitter pit. Good results were frequently obtained by manuring trees that were prolific bearers but which were not of vigorous growth.

Forest Range, April 17.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. J. Green (chair), J. Vickers, H. Waters, E. Rowley, A. Green, F. Green, O. Pollard, H. Sass, R. Collins, E. J. Green (Hon. Sec.), and five visitors.

COLD STORING OF APPLES.—A paper on this subject was read by Mr. Waters. He stated that merchants made a practice of purchasing apples and other fruits when prices were low, storing these until the season was over and then selling at remunerative rates on an almost bare market. He suggested that this should be done by the growers who might, by co-operating, reap the profit for themselves. In discussing the subject, Mr. Green mentioned that in Victoria every fruit-growing centre possessed a cold store. Ordinary fruit-storing sheds would be much improved if owners took the trouble to ensure even temperatures, and he suggested that motor-driven fans should be installed for this purpose. Mr. Vickers thought windmills could be used to drive the fans.

Longwood, March 22.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. W. H. Hughes (chair), J. Nicholls, J. Brown, J. C. Blakley, H. Vogel, J. Roebuck, G. W. Doley, J. R. Coles (Hon. Sec.), and three visitors.

MANURING FRUIT TREES.—A paper on this subject was read by Mr. Coles. In districts with a heavy rainfall, he said, cultivation, drainage, and manuring were so interwoven that it was impossible, practically, to consider one alone. Virgin scrub land was hard and contained very little humus, and, generally, the subsoil was of a retentive nature. Consequently, during the winter the surface soils were overcharged with water, and unless drainage were effectively carried out they would become hard in summer, and the results of manuring could not be realised. The plan he had adopted was, at the time of planting, to place a kerosine tin of stable manure with each tree and, in addition, apply 1cwt. of bonedust per acre, adding small quantities of the same manure when cultivating, which should be done very frequently. During the first five years of the life of the tree up to 2cwts. of bonedust per acre were applied, and after the trees had reached an age of 10 years 7lbs. were given to each annually. Most of the experiments conducted with regard to the application of lime to orchard lands had been inconclusive. The orchardist in light soils, stringybark ranges, and places of heavy rainfall should adopt extensive cultivation, thorough drainage, and liberal manuring.

Longwood, April 19.

(Average annual rainfall, 37in.)

PRESENT.—Messrs. W. H. Hughes (chair), J. Brown, W. Nicholls, J. Nicholls, J. C. Blakley, E. A. Glyde, J. Roebuck, H. Vogel, J. R. Coles (Hon. Sec.), and three visitors.

HOMESTEAD MEETING.—A visit was paid to the homestead of Mr. J. Brown. This constituted one of the oldest orchards in the State, having been planted more than half a century ago. Apple and pear trees inspected were very large, the butts in some cases being from 12in. to 20in. in thickness, the principal varieties being Stone Pippin apples, Evandale and St. Germain pears. Large crops of fruit were secured from the trees. A good deal of discussion took place with regard to the commercial side of fruit culture, and members agreed to give careful consideration to systems of marketing.

MacGillivray, March 18.

PRESENT.—Messrs. R. Wheaton (chair), A. Stirling, sen. and jun., J. Matthews, and H. C. Williams (Hon. Sec.).

FODDER CROPS FOR SHEEP.—A discussion on this subject was initiated by the secretary, who stated that at present there was not sufficient grass on some of the new country to warrant the introduction of sheep, unless indiscriminate feeding off was displaced by systematic cropping for fodder. During the earlier stages of settlement grass was too useful as a factor in clearing the land for it to be ruthlessly fed down. By allowing it to seed freely prior to burning off the area would annually extend. Members were of the opinion that wool was quite as important to local farmers as the carcass. The difference between wool produced by sheep fed on mangolds and on peas was particularly noticed. Peas were eaten readily by all classes of stock and with satisfactory results, and rape was found to be a good winter crop. Fodder crops should be sown only in well-prepared ground, and it was generally advisable to plough immediately before seeding and have the seed in to enable the plants to start before cold weather set in.

MacGillivray, April 15.

PRESENT.—Messrs. R. Wheaton (chair), H. Ayris, A. G. Nicholls, H. E. Petras, A. Sands, H. J. Wiadrowski, and H. C. Williams (Hon. Sec.).

ROTATION OF CROPS.—The reports of the Naracoorte Branch, printed on page 337 of the October, 1911, issue, and page 597 of the December, 1911, issue, of the *Journal* were read. Members thought that the various crops such as peas, turnips, swedes, and maize, which formed part of the system of farming in the South-Eastern districts, might be profitably grown on the island. After the first season, new ground required a long spell before wheat could again be sown if it had comprised the first seeding, and, therefore, the following crops might include oats (possibly for two successive years), barley, fallow, peas, or maize. On poorer land the first crop should be oats instead of wheat. By adopting a course of rotation there was a smaller area to be attended to, with the consequent advantage that the cultivated area was thus kept clean. Farming in this district was dissimilar to farming in mallee country where large paddocks were the rule. The local conditions, generally speaking, required small paddocks and close attention to manuring and crop management. Swedes were held to be superior to turnips for feeding to stock, especially milch cows, as turnips tainted the milk. Where mustard had been grown with rape it was noticed that the stock did not eat the mustard until after the rape had been eaten. Mangolds grew well in the district. The seed was drilled in thinly, and when the plants had become properly established they were spaced in the rows. Transplanting was not generally favored. With plants such as mangolds, carrots, turnips, and swedes, thinning out gave the best results when ample space was left between the remaining plants. This work was best done during cool weather. Peas were good for fattening sheep, especially if stores were bought off shears and sold after they had been fattened. In addition to the cash profit, the increased fertility of the land meant an enhanced yield with the subsequent crop. Poorly drained land was unsuitable for pea growing, but the growing of rye might be attempted on ground of this class. This was a suitable crop for feeding off. The absence of a market for the product restricted its growth for grain.

Morphett Vale, April 15.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. A. C. Pocock (chair), F. W. Crittenden, A. Connole, T. and A. Anderson, J. and E. Perry, H. V. Sprigg, T. Higgins, and E. E. Hunt (Hon. Sec.).

THE HANDY MAN ON THE FARM.—In a paper under this title Mr. A. Anderson discussed the question as to whether it would pay to keep on the farm what was generally known as the "handy man," in view of the present high rates of wages prevailing. The farm of about 600 acres usually required two teams, and the farmer looked after the lines which were generally considered most important, to the frequent neglect of those smaller lines which yielded a very good profit in return for due attention. On a farm of the area mentioned about three-quarters of the time of one man could be well spent in attending to repairs of machinery, implements, harness, gates, &c. Then there would

be less likelihood of the machinery having to be rushed to the blacksmith's for some minor repair just before it was required for use. Painting would take up a good deal of his time. Trolleys should receive a good coating of paint at least once in two years, and the woodwork of all machinery and implements should be similarly treated. Iron-work also should not be neglected in this regard. It would be found profitable to have all harness carefully oiled at frequent intervals. On the majority of farms there would be plenty of work in the direction of making and repairing gates and attending to fences. Where there were a number of horses kept a handsome return would be secured by giving attention to stable manure, which was so frequently allowed to waste. Care of the stables, haystacks, and yards, and many other matters of a like nature, could be attended to by an intelligent farm hand. As a general rule the man in charge of a team had not the necessary time to devote to these matters, and whilst it was always advisable to leave to competent tradesmen those particular undertakings which required the attention of the skilled man, it would well repay the average farmer with a fairly large area to keep a handy man on the place. Members generally agreed with the ideas expressed by the writer of the paper.

Mount Pleasant, April 11.

(Average annual rainfall, 27in.)

PRESENT.—Messrs. H. A. Giles (chair), T. Thomson, P. Miller, V. Tapscott, T. C. Phillis, D. C. Maxwell (Hon. Sec.).

AFFORESTATION.—Mr. P. Miller was of the opinion that practically the whole of the land in the proposed Barossa watershed was eminently suitable for the cultivation of forest trees. Gum trees, which yielded 50 large sleepers per tree, had been cut down in this locality on land that was suitable for nothing but tree-growing practically, and he was of the opinion that this country should be planted with timber.

STOCK.—It was reported that stock generally about the district were looking remarkably well.

Strathalbyn April 22.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. J. W. C. Fischer, J.P. (chair), M. G. Rankine, J. C. Heinjus, A. Beviss, R. Cockburn, W. Knight, J. R. Rankine (Hon. Sec.).

FEEDING OFF PEAS.—It was unanimously agreed by members that sheep, with the exception of old wethers, would fatten readily on peas. Mention was made of the case of a few old ewes which were valued at 2s. 6d. per head being turned on to a pea crop, and eventually being sold at 14s. each. It was better to turn the sheep on to a partly-harvested crop than on to a field of unharvested peas, as in the latter case the peas were trodden in by the sheep, and were also fouled by the droppings.

MANURING ORCHARDS.—It was generally agreed that it paid to manure orchard and vineyard lands. It was found that where potato ground in this district was not manured the crop would be a failure.

Uraidla and Summertown, March 3.

(Average annual rainfall, 42½in.)

PRESENT.—Messrs. E. Hart (chair), E. Hawke, J. Rowe, R. N. Cobbledick, T. H. Collins, W. Kessell, H. F. Johnson, W. Squires, W. Dyer, and G. Prentice (Hon. Sec.).

PLANTING AND CULTIVATING ORCHARDS.—In a paper on this subject Mr. W. Squires said that land for fruit-growing should be well cleared of all timber during the winter months. Before it had an opportunity to dry it should be ploughed to a depth of 6in., the plough being followed by a good subsoiling. During the summer the soil should be left rough. The trees should be planted 20ft. apart in round holes about 3½ft. across and 2ft. deep. Lime and bonedust should be added to the soil. Early planting was preferable, and the trees should be pruned hard every three years. Export varieties

of apples were best, those producing colored apples being put on high ground. Old trees should be spur pruned and have the undergrowth taken away. Bordeaux mixture was recommended for fungus diseases. For codlin moth arsenate of lead, mixed with water at the rate of 1lb. of lead to 20galls., was recommended when the petals fell, followed again by a further spraying a fortnight later. In discussing the subject, Mr. W. Dyer said it was not wise to put in the trees deeper than the land was broken up with the plough. Mr. Hawke recommended the planting of some of the best varieties of cherries and Japanese plums in addition to apples.

SOUTH-EAST DISTRICT.

Glencoe, February 17.

(Average annual rainfall, 33½in.)

PRESENT.—Messrs. A. Dow (President), M. D. Cameron, J. Dow, J. Holloway, H. G. Halliday, J. Riddoch, jun., W. Lehmann, F. A. Telfer, G. F. Ferguson (Hon. Sec.), and one visitor.

SUMMER FALLOWING.—Mr. W. Lehmann read a short paper under this heading. The best time to plough in this district, he said, was during January and February, when the ground was absolutely dry. It should be broken to a depth of about 5in. and allowed to lie in as rough a state as possible, as there was then less trouble with drift, and a larger surface was exposed to the influence of the sun. Immediately after the first rains the land should be harrowed. This was the best means of destroying weeds and insect pests. In reply to questions, the writer of the paper said the practice recommended was equally suited to heavy and light soils, and cereal and root crops. If a heavy rain fell soon after ploughing, the land should be ploughed again. The usual course was to fallow in January, harrow down and plough again in March, keeping the land clean with the springtooth cultivator until sowing in May. Where deep ploughing had been done in summer, skim ploughing was sufficient at seeding time. Some of his land had been affected with blister, and as an experiment he had ploughed in September and had worked the ground as a bare fallow through the summer and on until the following August, when he planted potatoes. The resultant crop was practically free from blister. He then took a crop of grain from the land, and the following crop of potatoes, planted in the ordinary way without fallow, was badly affected with blister. The constant cultivation prior to planting the potatoes starved out the eel worms, and fallowing as outlined above was worth a further trial. Mr. J. Dow had tried summer fallowing, but it had not been a success. The general opinion was in favor of the practice, although the extra cereal yield might not always compensate for the loss of grass through the early cultivation.

Glencoe, March 17.

(Average annual rainfall, 33½in.)

PRESENT.—Messrs. A. Dow (chair), P. Clifford, G. E. Copping, J. Dow, J. T. Halliday, J. Holloway, W. Holloway, W. Lehmann, T. F. Gratwick, F. A. Telfer, G. F. Ferguson (Hon. Sec.)

AUTUMN CATCH CROPS.—Mr. A. Dow read a paper on this subject. With a good rain about the middle of March, and the crops sown immediately after this, he said profitable results could usually be secured. He had tried various fodders, and had decided that oats was the best, as this crop withstood the cold weather. Cape barley would be found to grow well during fine weather, but it failed when wintry conditions were experienced. Rape and mustard had not been a success. Berseem and Crimson clover were both choked out by a strong growth of Cape weed. He had sown rye and vetches at the rate of 2bush. of seed to the acre, but the crop was extremely thin. Italian rye grass, sown at the rate of 2bush. per acre, came up thickly, grew well, and stood feeding off splendidly. It was his intention to sow 20 acres with this during the coming year, distributing the seed at the rate of a bushel and a half per acre, and covering it slightly by going over it with a chain. Mr. Gratwick mentioned that Victorian farmers made a practice of sowing

Italian rye grass and cow grass with the oat crop. After the oats were harvested, a good stand of green undergrowth was available. Mr. J. Dow thought rye grass exhausted the land. He had sown oats in autumn and grazed his cows on it till September, and following this, secured 10bush. of oats per acre. Immediately afterwards the stubble, which carried a splendid undergrowth of Mount Schanck clover, was out.

MANURIAL TESTS.—Tests which had been conducted on the farm of the hon. secretary, under the Superintendent of Agriculture in the South-East, with the idea of determining the value of various manures applied at different rates were reported on. Two bushels of Algerian oats were sown to the acre, and the manure dressings and harvest results were as follows:—Plot 1, receiving mineral super., 2cwts. per acre, yielded 38bush. per acre; plot 2, mineral super., 1cwt. per acre, 38·88bush.; plot 3, basic slag 2cwts. per acre, 43·644bush.; plot 4, basic slag, 1cwt. per acre, 46·85bush.; plot 5, no manure, 41·46bush.; plot 6, bone super., 2cwts. per acre, 56·78bush.; plot 7, bone super., 1cwt. per acre, 56·01bush.; plot 8, bonedust, 2cwts. per acre, 53·60bush.; plot 9, bonedust, 1cwt. per acre, 46·62bush.; plot 10, mineral super. and wood ashes, 2cwts. per acre, 47·44bush.; plot 11, mineral super. and wood ashes, 1cwt. per acre, 41·50bush.

Millicent, April 8.

(Average annual rainfall, 28½in.)

PRESENT.—Messrs. Holzgreffe, Bowering, Major, Serle, Downs, Edgecumbe, and Day (Hon. Sec.).

COMPULSORY REGISTRATION OF STALLIONS.—This subject was discussed by members. Messrs. Serle and Downs thought more disease and loss were encountered with well-bred horses than the ordinary animal. Mr. Major pointed out that people were unable to prove the value of a stallion until it had been in the district for some time. Compulsory registration might tend to make owners of valuable registered horses, standing at a high fee, refuse any but high-class mares, whilst the fees to a certain extent depended on the horse market. Mr. Holzgreffe agreed that to limit the number of stallions in a district would be impracticable, but he favored compulsory registration. It was a mistake to patronise an inferior animal. The object was to improve horseflesh, and it was a worthy one. In the Wimmera district and other parts of Australia there were splendid horses, but the difficulty was to obtain good mares. After further discussion the motion was put to the meeting and the vote resulted in favor of the proposals by a majority of one.

DRAINAGE.—Mr. J. Bower read a paper on this subject. As the water was removed from the land in this district, he said, year by year the surface became drier and cracked. It was thought in some quarters that the drains had been made too deep, and attempts were made to raise the water to the surface again by building dams. However, the ground became waterlogged, and the forcing upwards of the water resulted in the deposit of a sediment on the surface which was detrimental to vegetation. If the water could be regulated to a depth of not less than 3ft. below the surface good results should be secured. When water percolated downward through the soil, and any excess quickly passed away, an immense benefit was secured, but when it came upwards considerable damage could be done. In discussing the subject, Mr. Serle agreed that good drainage was necessary if satisfactory yields were to be obtained. The retention of the necessary moisture in the soil needed to be brought about by thorough methods of cultivation. Mr. Holzgreffe condemned the wide, shallow channels. The spoil bank dammed the water during the wet months, and sometimes broke and flooded the country for miles. Mr. Major thought it was only necessary to remove the surface water. He had found shallow drains satisfactory.

Mount Gambier, April 12.

(Average annual rainfall, 31½in.)

PRESENT.—Messrs. Wedd (chair), Sassanowsky, Botterill, Pritchard, Ruwoldt, Major, Kennedy, Wheeler, G. Collins, and D. Collins (Hon. Sec.).

FRUIT-GROWING.—The chairman read the following paper:—"As the season for planting fruit trees is near at hand I thought it would not be out of place to make a list of the varieties of apples that are best suited for this district, and at the same time make a few remarks as to the best way to plant the trees. In the first place it is advisable before planting to select a piece of land that can be well drained, and, if possible, a piece that has a clay subsoil. Do not think that the rich land around the Mount, with its porous subsoil

will grow the best fruit. A sandy loam with a clay subsoil will grow far better fruit, and it can be easily worked, even in the summer time. After having selected the site, fence it well to keep out rabbits and other pests; then select trees of varieties known to do well in the district. If planting for export do not plant too many sorts. Before planting, first measure the land and put a peg in the place where the tree is to be planted, say, 20ft. apart each way. That will give 100 trees to the acre. Do not just dig post holes and set the trees in them, expecting them to grow and thrive, but dig a hole 3ft. across the centre to give the roots plenty of room in which to spread. Do not plant too deeply. Spread the roots all round the stem and see that the points of the roots are downwards. Cover them with a fine mould and the tree will have a chance to grow well. Mulching in the hot weather and loosening the soil around the trees should receive attention. After planting, prune the young trees back well to about four buds; do not be afraid to cut them well back as they will do all the better for it afterwards. The following is a list of apples that are suited to this district:—Adam's Pearmain, Jonathan, Hoover, Gravenstein, Ben Davis, Cox's Orange Pippin, Dunn's Seedling, Lord Wolseley, Five Crown Pippin, Nickajack, Quarenden, Cleopatra, Ribston Pippin, Reinette de Canada, Pomme de Neige, Worcester, Pearmain, Red Astrachan, Lawrence, Emperor, Filbasket, Late Aromatic, and Rome Beauty." About 20 varieties of apples grown by the writer of the paper at Ardno were tabled. In discussing the subject, Mr. Sassanowsky said the poor soils of the district were capable of producing excellent crops of fruit. He thought the fruit industry, in the course of time, would develop into one of the largest in the South-East. Mr. Wedd, in reply to questions, said when apples were required to keep for any length of time they should not be picked before the pips were well blackened. Pears should be picked at an earlier stage.

Naracoorte, March 8.

(Average annual rainfall, 22in.)

PRESENT.—MRS. L. Wright (chair), W. Loller, W. H. Smith, A. J. Johnson, A. Caldwell, and S. H. Schinckel (Hon. Sec.).

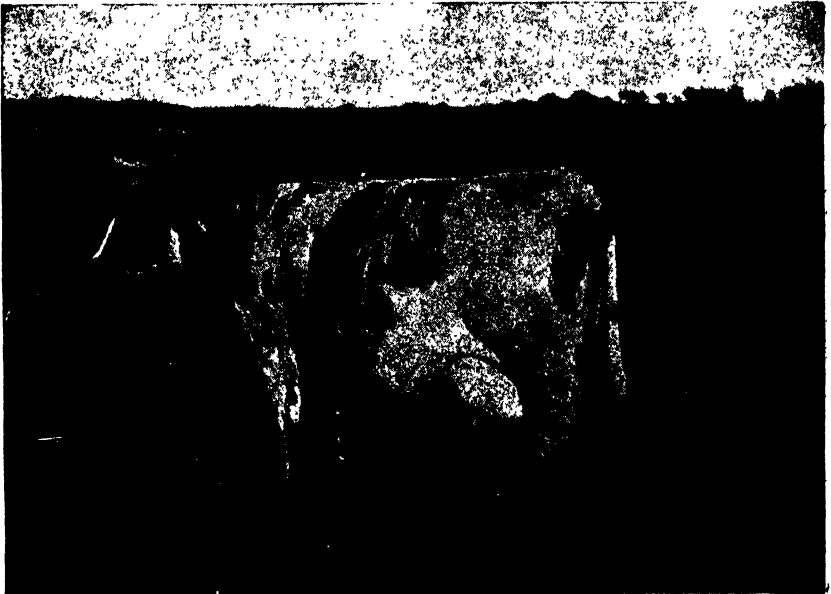
FARM YARD MANURE.—The paper read by Mr. W. H. Smith at the last meeting, a resumé of which was printed on page 1071 of the April issue, was further discussed. Mr. S. H. Schinckel thought British farm yard manure would show a better analysis than Australian, as the stock at home were fed on richer foodstuffs. When a good clay bottom such as was available at Hynam, could be obtained, it was unnecessary to go to the expense of installing cement pits and drains for manure. The greater part of the manure was collected during ploughing and seeding, and it would pay to cart it on to the land at once. It might be left as a top dressing for pasture or used on fallow land. Mr. W. Loller also thought it unnecessary to provide a cement pit. When it was deposited on the heap, from time to time a covering of earth could be put over it; this would conserve its fertilising properties. In reply, Mr. Smith mentioned that the bulk of the food given to stock in England consisted of meadow grass, which did not contain as much nourishment as the hay used in Australia. The greater part of the winter food consisted of swede turnips.



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Dairy: Milking of Cows; Spaying of Cows; Taints and Flavors of Dairy Produce; Taints in Milk and its Product.

Stock: Branding of Stock; Stomach and Bowel Diseases of the Horse; Bot Flies and Bots.

Beekeeping Notes.

[Every farmer and fruitgrower should join the Agricultural Bureau. Write to Department of Agriculture for particulars.]

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T. PASCOE,

MINISTER OF AGRICULTURE.

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T. PASCOE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Some Factors Influencing the Efficiency of Bordeaux Mixture.

According to Bulletin 265 issued by the Department of Agriculture, Bureau of Plant Industry, an investigation was undertaken to discover by what methods the most uniform distribution of the copper compound in the Bordeaux mixture can be obtained, and to ascertain how the adhesiveness of the mixture to the susceptible parts of the plants can be increased. The following conclusions were arrived at:—(1) That a Bordeaux mixture in which the suspension of the copper compound settles out slowly may be prepared by adding the concentrated calcium hydroxide to the diluted copper sulphate solution or *vice versa*, provided the mixture is sufficiently agitated. Practically as good results were obtained with these methods of preparation as by diluting the two components in separate vessels and pouring them simultaneously into a third. (2) That the addition of certain substances tended to increase the adhesiveness. From experiments with grape berries it was concluded that the addition of an adhesive to the fungicide was necessary in order to cause the latter to adhere to the bloom-covered grapes. Rosin-fish-oil soap gave the best results as an adhesive, ground glue came second, and fish-oil soap third. Ferrous sulphate did not increase the adhesiveness of the mixture to the berries. No appreciable quantity of copper was found on the berries sprayed with Bordeaux mixture alone. In the case of leaves it was shown that rosin-fish-oil soap added slightly to the adhesiveness of the mixture. The strength of rosin-fish-oil recommended is 2lbs. to 50galls. of Bordeaux mixture.

The Shire Horse.

Addressing the last annual meeting of the English Shire Horse Society, a well-known breeder stated that unless they, as a society, were willing to alter the type of animal for export, little or no success would attend it. They were late in the field, and the increasing use of motor traction in the streets was against the heavy horse. Though, undoubtedly, intended primarily for the breeder, yet he in time must rely more and more on motor machinery for his operations. Percherons and Clydesdales had got such a hold on the American farmer that they would not use the Shire. He was not wanted in New York; their weight killed them; they wanted speed. He saw the same conditions operating in London, and he asked them to consider how many Shires were being used on the London streets for hauling.

Livestock in Germany.

The preliminary results of the census of livestock taken on December 2nd, 1912, give the number of horses as 4,516,297, compared with 4,345,047 on the same date in 1907; of cattle as 20,158,738, compared with 20,630,544; of sheep as 5,787,848, compared with 7,703,710; of pigs as 21,885,073, compared with 22,146,532; of goats as 3,383,971 compared with 3,533,790; and of poultry as 82,474,317 compared with 77,103,045.

Milk Records.

In an article in the *Mark Lane Express* dealing with milk records, the opinion is expressed that some sort of district control is necessary to success, but that under a suitable system all cows yielding less than 600galls. could be weeded out in less than a year. "The saving to a dairy where 40 cows could replace 60, both in labor and feed, to say nothing of the increased profit from cows giving 700galls. instead of 500galls., would," says the writer with a touch of humor, "more than repay the slight cost of a spring balance, milk pail, and record pad, and the few minutes occupied at each milking in taking the record."

Hints on Soil Blasting.

A method of preparing holes for dynamiting (says the *Pacific Rural Press*) that will save probably more than two-thirds of the present expense of blasting to tree planters is used by the Natomas company in their extensive plantings in Sacramento county. The apparatus is simple, can be made at any blacksmith's, and the idea is free to all. The value of blasting for tree-planting is universally admitted where the subsoil is packed. The cost of dynamite is small, but the cost of boring the holes to get the dynamite where it is wanted is often large, for the soil that needs dynamiting is hard to get into. The ordinary soil auger, with a diameter of about 3in., is slow work. The driving of an iron bar down is very easy and quick, but the trouble has been in getting it up again. This is simply a means of getting it up in about three seconds. The bar to be used should be six-sided, for a round bar binds in the hole. At the top is an iron cap which gives it thereabout an incl. more thickness. The other apparatus is an iron wheel weighing about 20lbs. It may be a pulley wheel, the wheel of an old car, or anything else. Holes are bored on two sides of the wheel close to the edge and chains or ropes attached thereto, so when two people would jerk suddenly, one on each rope, the wheel would be thrown up from the ground, just as a man attending lodge for the first time might be tossed in the blanket. The wheel used in this way is used as a hammer to drive the bar out of the ground. The hole

in the centre is large enough for the bar to pass through, but smaller than the cap on top. It is put just where the hole is to be blasted and the bar driven down as far as it is wanted ; then the wheel is given a couple of tosses and the bar is pulled up easily. The whole thing can be done in about three minutes or less, even in pretty hard ground. The holes blasted by the Natomas people are said by them to cost about 11 cents each, powder and all, as against 30 cents for ordinary blasting, and a couple of dollars for the hardest kind of ground.

Tuberculosis in Cattle.

Until 1906 tuberculosis was apparently unknown amongst the cattle, on the island of Guernsey, from whence comes the breed of that name ; but it was that year introduced by cattle reimported after having been to England for exhibition. This reimportation is now forbidden, and drastic laws have been passed compelling the slaughter of all infected cattle and granting State compensation. As a result, the disease has been practically stamped out, and of the 1,346 animals exported during the past three years, all of which were tested with tuberculin, only six were found to be affected. According to the *British Medical Journal*, from which the above is taken, the forms of human tuberculosis chiefly caused by bovine tuberculosis (tuberculosis glands of neck, abdominal tuberculosis, and lupus) are consequently exceedingly rare in the island of Guernsey. There is no mention made as to the method of detecting tuberculosis on the island except that reference to the tuberculin test before exportation. Some recent investigations on bovine tuberculosis show that occasionally a cow may have tuberculosis in such a form that tubercle bacilli may be emitted in the milk even though the cows to all appearances had sound udders. No tubercle bacilli could be detected in the urine.

Agriculture in Germany.

Mr. Cahill, in a Blue Book issued by the Board of Agriculture, tells us that "in no modern State does organised effort for safeguarding and promoting the economic interests of agriculture appear to have been so persistent and so successful as in Germany," and although he recognises that it has taken years of careful management to bring the German system to its present condition of widespread efficiency, he sees no reason why similar results should not be produced in the same time in this country "if a similar intensive and penetrating propaganda can be set in motion." Co-operation in dairying caught Mr. Cahill's attention, and he tells us that the number of registered dairy societies grew from 693 in 1890 to nearly 3,500 in 1912, and, in addition

there are from 600 to 800 unregistered societies. There are three principal types of dairies. The most numerous, forming, indeed, about four-fifths of the whole, are those in which the cream is separated and the butter made, the separated milk and buttermilk being afterwards in most cases returned to the suppliers. Those which sell the new milk or utilise both the new milk and the separated milk and buttermilk are said not to be numerous, as they necessitate larger capital outlay and more expensive management, while the commercial side of the undertaking is more difficult. The third group is known as cream depots; these only separate the cream.

Get Rid of the "Robber" Cow.

In building a dairy herd of great milking capacity it is necessary, says the *Farmers' Union Advocate*, for the dairyman to realise that the quickest way to that end is by culling the "robber" or "boarder" cows; that it is only a millionaire dairyman who can afford to buy scrub bulls at 50s. per head; and also that it is only cows of great milking capacity that will pay for a little extra feed; while, on the contrary, the more he feeds the "boarders" the less will be his net profit. He must also realise that a good yield cannot be expected from a cow which comes to her period of lactation in a poor condition. As to the respective value of the various milking breeds, this is too delicate a matter to discuss; but of this it is certain, that it is much easier to improve the milking qualities of a pure breed than it is to make a breed and improve it. It is also certain that more profit can be made on a small farm from a small pure herd than from a large herd of mongrels, even though it has to be admitted that some of the greatest producers are crosses.

Experiments with Fertilisers on Meadows.

The Agricultural Department of the Swiss Government have just published an interesting report of experiments conducted over three years to test the effect of different fertilisers on meadow land. The fertilisers experimented with were nitrogen, phosphate of lime, and potash, the fertilisers being tried alone and mixed. The conclusion arrived at is that, in order to obtain the heaviest and most profitable crops it is necessary to apply fertilisers containing the three principal fertilising substances phosphoric acid, potash, and nitrogen. The extra yield obtained from this system of manuring covers the cost of the fertilisers and leaves a good profit. The effect of the manures is more marked on the first cutting than on the second cut, the average increase having been found to be from 62 per cent. to 100 per cent. on the former and 20 per cent. to 40 per cent. on the second crop.

Veterinary Inspection of Stallions.

The Clydesdale Horse Society of Scotland, discussing the veterinary inspection of stallions by the Board of Agriculture, passed the following resolution: "This society considers that legislation excluding from public service stallions not passed as sound by an official veterinary examiner is at least quite premature, and should only become operative as applicable to animals foaled after the passing of the Act."--*Mark Lane Express*.

Sheep in the Argentine.

Much has recently been written regarding the decrease of our cattle and the necessity for remedying same, says an Argentine correspondent, but a large breeder, writing to the daily press, points out that in the Province of Buenos Ayres the same state of affairs rules as regards sheep, as the number of sheep now existing there is only equal to 50 per cent. of the stock of 10 years ago. This, he states, has been partly due to the belief that the sheep reduced the value of the land, and because of the work entailed. He strongly advises that endeavors be made to increase the flocks to the figures of 10 years ago, and particularly recommends agriculturists to dedicate part of their lands to this industry, not "putting all their eggs in one basket." as agriculture, he states, cannot alone always prosper. A field sown with early wheat will serve excellently later for fattening the stock, while, in the event of a bad harvest, the same land can be utilised for the sheep and a bad year all round for the farmer will be very improbable.

New Theory on Resistance of Fruit Pests.

At the Spokane National Apple Show (says the *Californian Fruit Grower*) something of a sensation was created by the suggestion of Professor Melander, head of the department of entomology of the Washington State College, that it is possible that under continued spraying with insecticides harder strains of insect pests are being produced, which are better and better able to withstand the effects of the poisons. "In other words," said Professor Melander in his address, "it is possible from a biological standpoint that we are breeding the resistant insects. If there is such a thing as this, it is a big, big thing in the fruit world. A few years ago we were cocksure that sulphur-lime would kill red spider eggs, would kill eggs of the green aphid, and yet I have examined I don't know how many millions of red spider eggs this year and failed to find them dead after being sprayed with sulphur-lime. The same can be said of the green aphid in a good many localities. Whether it is a biological fact that scale and other insects are becoming resistant by

a gradual process of weeding out the individuals that are not hardy I do not know ; but I do know that some of the standard sprays are not nearly so sure and effective as they used to be. That is the main thing that I wanted to surprise you with at this time. If the biological theory is true, that we are breeding up scales that are resistant to this or that spray, it may be that we shall have to switch our methods of fighting the pests, we will say every 20 years. We will spray with sulphur-lime ; that will be the best for 20 years, and then we will switch over and take up the oil emulsion and spray with that for 20 years until we get a scale that is resistant to oil emulsion, and then come back and switch to the other. Biologically it is possible to rear up a breed that would be resistant."

French Cattle Insurance Societies.

There has been a great increase in the number of mutual cattle insurance societies in France, particularly in recent years, according to statistics supplied by the International Institute of Agriculture. The number increased from 2,264 at the end of 1900 to 8,869 at the end of 1911, when the capital insured amounted to £24,210,000. In addition there were 65 reinsurance societies, securing £6,900,000. The term "cattle" is used for livestock of all classes.

Docking Horses.

"None of the Royal carriage horses have been docked during the last three reigns," remarks Mr. Walter Winans in a pamphlet on "The Absurdity of Docking," issued with the report of the National Equine Defence League. "It seems curious," he adds, "that society generally does not follow the Royal example." A Bill to secure the legal suppression of the practice has been introduced in the House of Commons by Sir John Rolleston, M.P. It was prepared in collaboration with Mr. Winans, Mr. Cecil Chapman, J.P., Mr. J. G. Butcher, M.P., and others who attended a conference held on the subject last October by the league. —*Agricultural Gazette*.

Life in Soil.

The soil of a farm is not simply an inert mass of material containing certain mineral substances which plants utilise. It is full of living organisms. Besides the numerous insects, worms, &c., it contains myriads of low organisms, not visible to the naked eye but capable of examination by the aid of the microscope. They are known as bacteria or micro-organisms, and are so minute that a gram of soil may contain many thousands, increasing and propagating under favorable conditions with incredible rapidity. They exist in soils chiefly in the upper layer. A pinch of soil may contain from

several thousands to several millions ; loamy soils and soils containing much organic matter contain most, sandy soils contain least. The number decreases gradually from the surface soil downwards till about 3ft., where few or none are present. Each different kind of bacterium performs its own useful purpose in Nature, but in the interest of economical cultivation it would appear that the growth of some of them have to be encouraged and the development of others to be checked. The subject, however, is not at present clearly understood, and has to be further investigated by scientific men ; for us the practical knowledge is that organic matter, increasing the supply of humus to the soil, has been proved to favor the rapid growth of the kind of bacteria which convert organic ammonia into nitrates, suitable for assimilation by the crops. We have, therefore, to see that we keep up in the soil by application of farmyard manure, the ploughing under of green crops and other suitable means, a sufficient supply of humus.—*Mark Lane Express*.

Shire Horses and Feather.

A letter which C. W. Tindall sent to the English agricultural papers on the type of Shire horse to cultivate has given rise to considerable discussion. The object of the letter was to awaken breeders to the fact that if they are to create a market for the breed abroad it will be necessary to modify the type that at present is in favor in the showyard. The Shire is the weightiest and most powerful of all breeds, possessing greater width and depth of body and more bone than the Clydesdale, the Suffolk, or the Percheron, but he lacks their speed, and, what in the eyes of foreigners is a greater defect, he has too great a profusion of hair on the legs. With home breeders ample "feather" is regarded as a prominent characteristic, prized as an adornment as well as in the belief that it denotes plenty of bone, robust constitution, and hauling power. This view is not indorsed anywhere abroad, nor indeed does it meet with general acceptance in all parts of England. The profusion of hair which pleases the eye in the show ring is a great inconvenience on the land. Fashion and utility in this respect are so wide apart that it seems not uncommon for farmers to keep one type for showing and another for working. In North and South America, in Australasia, and on the Continent, the Shire is rejected because of the hair on the limbs. Mr. Tindall, who has been one of the staunchest supporters of the breed, merely calls attention to what is a hindrance to the opening up of new markets, and suggests that the question might be considered of modifying the limb formation in accordance with foreign preference. He does not urge that this should be done at a sacrifice of weight or power, but believes that it might be possible to effect the alterations in the limbs without injury to the other qualities.—*Pacific Rural Press*.

Livestock in United States.

The Crop Reporting Board of the Bureau of Statistics estimate that on January 1st, 1913, there were on farms and ranges in the United States 20,567,000 horses, compared with 20,509,000 on the same date in 1912; 20,497,000 milch cows, compared with 20,699,000; 36,030,000 other cattle, compared with 37,260,000; 51,482,000 sheep, compared with 52,362,000; and 61,178,000 pigs, compared with 65,410,000. *Journal of British Board of Agriculture.*

Agricultural Production in Germany.

At the annual meeting of the German Agricultural Council, says *The Gardener's Chronicle*, the Emperor William delivered an address on the results of land reclamation experiments carried out on his estate at Cadinea. His Majesty gave statistics which showed that reclamation of the marshland on the estate had proved a financial success. He claimed, moreover, to have proved that agricultural production in Germany could be so increased as to satisfy the home demand not only for meat, but also for bread.

Milk Records.

A report on milk records for the season 1911 has been issued by the Scottish Milk Records Committee. These records relate to 13,965 cows. The lactations recorded are those actually or practically terminating in 1911. The report records that "experience confirms the view that the best unit to employ in the comparison of milk yields of various qualities is that which reckons them in terms of gallons estimated at 1 per cent. of butter fat." Yields of which the quantity and quality taken together amount, in the case of cows, to 2,500galls. calculated on a basis of 1 per cent. fat, and, in the case of heifers, to 2,000galls., are considered good. Cows and heifers giving below 1,660galls. and 1,330galls. respectively are classed as bad. The "good" figures correspond to 714galls. and 570galls. on a quality basis of 3.5 per cent. fat, while the "bad" figures correspond to 474galls. and 380galls. respectively. The statements of milk yields are given in terms of actual quantity and quality of milk, and not in terms of the hypothetical unit mentioned above. A lengthy appendix gives the results on individual farms, showing in each case (a) cows yielding over 2,500galls., calculated at 1 per cent. butter fat; (b) heifers yielding over 2,000galls., calculated at 1 per cent. butter fat; (c) cows yielding under 1,660galls., calculated at 1 per cent. butter fat; (d) heifers yielding under 1,330galls., calculated at 1 per cent. butter fat. The work was administered through local milk record societies, of which a list is given. Five new societies were formed during 1911, and the number of herds under test rose from 217 in 1910 to 333 in 1911, while

the total number of cows tested shows an increase from 9,500 in 1910 to 13,965 in 1911. Taking only those societies which were in existence in both years, out of 9,514 animals tested in 1910 1,756 cows and 627 heifers were "good," and 495 cows and 60 heifers were "bad," while out of 10,044 animals tested in 1911, 2,071 cows and 805 heifers were "good" and 443 cows and 27 heifers were "bad."

Imports and Exports of Fruits, Plants, Etc.

During the month of May, 1913, 19,061bush. of fresh fruits, 8,996bush and 455 bunches of bananas, 7,227 bags of potatoes, 616 bags of onions, 7bush. of sweet potatoes, and 104pkgs. of plants, seeds, and bulbs, etc., were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 42pkgs. of bananas (over-ripe) and 1pkg. of plants (no declaration) were rejected. Under the Federal Commerce Act 1,078 cases of fresh fruit, 3,132pkgs. of dried fruit, 7pkgs. of preserved fruit 427pkgs. of honey, and 14pkgs. of plants and trees were exported to overseas markets during the same period. These were distributed as follows:—For London, 2,502pkgs. of dried fruit and 306pkgs. of honey; for Hamburg 121pkgs. of honey and 7pkgs. of preserved fruit; for South Africa, 430pkgs of dried fruit; for India and the East, 941 cases of apples; for New Zealand 137 cases of lemons, 200pkgs. of dried fruit, and 14pkgs. of plants and trees Under the Federal Quarantine Act, 1,074pkgs. of plants, bulbs, seeds, nuts etc., were examined and introduced from overseas markets.



Shipping Wheat.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

STOCK INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Government Veterinary Lecturer.)

Horses—Various Inquiries.

"J.F.W.," Macclesfield, inquires the cause and cure of warts which have rapidly covered the lip and nostril of a mare, and have also attacked a colt.

Reply—The real cause of such a growth of warts is unknown, but prickly forage is a contributing factor. Wiping the warts daily for a few days with vinegar or castor oil is usually sufficient to bring about their disappearance; if it does not, painting them daily with a little tincture of thuya will do so.

"J.J.," Ramco, Waikerie Branch Agricultural Bureau, has a five-year-old horse that has a capricious appetite, and passes worms yellowish-white about 2in. long, tapering off to a fine tail; also one or two worms of a similar color, but 8in. or 9in. long. The owner desires treatment for horse.

Reply—The small worms described are the common whip worm (*Oxyuris curvula*) which lives in the hind gut and does no particular harm, but is evidence that the horse's general condition is low. These worms are best removed by an injection of a quart of warm milk, in which a wineglassful of turpentine (2ozs.) is thoroughly mixed; this injection is quickly expelled from the bowel and the worms come with it. The larger worm is the common round worm of the horse (*Ascaris megalocephala*), which lives loose in the small bowels and does no particular harm if not present in large numbers—a kerosine tin full have been taken from a colt in South Australia—in which case they produce serious symptoms. Efficient treatment is to give the horse nothing but bran mashes for two days, and then to administer a five dram aloes ball, which can be procured ready made from a chemist. The worms will be expelled with the scouring. It will be well to let the horse have $\frac{1}{2}$ oz. salt and 1 dram sulphate of iron in feed daily for a fortnight.

Dawson Branch of the Agricultural Bureau inquires symptoms, cure, and origin of blood worms.

Reply.—The only definite symptom is the appearance of the worms on the lining of the large bowels in a dead horse, also in the blood vessels along the large bowels. They may occasionally be found in the dung. The common sorts are about 2in. to 3in. and about half an inch long respectively. Details of their life history may be found in a paper on parasites in a recent number of the *Agricultural Journal*. Symptoms during life are loss of condition, irregular appetite, and frequently weakness of the limbs. They develop in mud at sides of dams; hence necessity for pumping and filtering. Treatment—Under three years half an ounce of Fowler's solution of arsenic twice a day in food for a fortnight, then stop for a similar period and repeat for third fortnight. For adult horses $\frac{1}{4}$ oz. to 1oz. similarly.

Insufficient Particulars.

The Moonta Branch states that two cows fed on wheaten hay twice a day and turned into a paddock with others are stiff, constantly lying down, and losing condition fast, though not off feed or going off in milk. They ask the cause and treatment.

Reply.—The symptoms are not full enough to give a diagnosis on, but if there is a cough as well it is probable that they are tubercular, and it seems desirable to inform the Chief Inspector of Stock, who would send a veterinary officer to inspect them.

Not Bot Flies.

The Pekina Branch recently forwarded some flies for identification.

The Government Entomologist replies—The specimens in size, and in some respects in appearance, resemble the common bot fly of the horse; but they are really bees, not, of course, the common hive bee, and possess four wings, whereas the bot fly has but two. Unfortunately all four specimens arrived with their heads broken off. We would be glad of some specimens in perfect condition.

Blind Bullocks.

"G. H.," Page's Flat, wants a cure for bullocks running on burnt yacca country which have gone blind in both eyes.

Reply.—This affection is very common on such country, burnt or otherwise. The real cause has not been definitely settled, but the yacca must apparently bear a share of the blame. The following treatment is sometimes found to do good :—First take two or three quarts of blood from the neck vein; then give Epsom salts, 1lb.; flowers of sulphur, 1oz.; ground ginger, $\frac{1}{4}$ oz.; all dissolved in a quart of warm beer. Blow a tiny pinch of calomel into each eye every three or four days for three occasions. After the scouring of the drench has passed off give daily in the food for a fortnight a teaspoonful of Cooper's sheep dip, one part, and common salt, eight parts.

Horses—Various Troubles.

“T. E. D. F.,” Kingscote, has a mare whose hind fetlock clicks as if the bone were slipping into place. He asks for treatment.

Reply—The symptoms are too meagre to be able to tell the real cause of the click, which, however, most probably arises from a weakness of the ligaments which support the joint. Bathing in the sea for an hour or two daily would be the best remedy, but if this cannot be carried out, well rubbing the joint with 1oz. tincture of arnica mixed with a pint of methylated spirit, about $\frac{1}{2}$ oz. being used at a time, will help. If a bandage is used it would do more good if several thicknesses of cotton wool were wound round the joint before applying the bandage as tightly as possible.

“W. H. C.,” Cummins, has a 12-year gelding with a swelling under the lower part of the eye, size of an almond, hard and bonelike; animal nearly blind; 12 days' growth.

Reply—There cannot be a bonelike growth in this situation, but from the symptoms it is possible that the horse has an attack of ophthalmia, or else some sort of tumor growth. If the latter, removal by knife is the only cure; if the former, frequent bathing with hot water, one pint, tincture of arnica, one dram (one teaspoonful), and boracic acid, one dram, will relieve. Keep the horse out of bright sunlight as far as possible, or bind a cloth wetted with equal parts of methylated spirit and water over the eyes.



Horses, Near Adelaide.

EXTRACT FROM TRADE COMMISSIONER'S REPORT.

The following is an extract from the Trade Commissioner's Report, dated London, April 18th, 1913 :—

FROZEN MEAT.							
				Mutton.		Lamb.	
Quotations are as follows :—	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	
New Zealand	2	8 to 3	8	..	4	1 to 4 5	
Australian	2	4 to 2	8	..	3	8 to 4 0	
Argentine	2	5 to 2	8	..	3	8 to 3 10	
Arrivals since last reported —	Mutton.				Lamb.		
Australian	110,971				..	47,043	
New Zealand	19,160				..	34,228	
Argentine	43,256				..	2,551	
Approximate quantities now afloat—							
Australian	260,000				..	125,000	
New Zealand	280,000				..	680,000	
Argentine	220,000				..	65,000	

FRUIT.

The market in London is, if anything, a little better, but even so, is not as satisfactory as I should like to see it. The very best varieties are being offered at from 10s. to 12s. The top price realised for Australian apples in Hull was 11s. The fruit shipped in the white wood boxes realised the best prices, the hard wood having a most unattractive appearance.

The German selling agents have informed me that they have inspected the pears *ex* the s.s. *Oberhausen*, and found them to be in good condition, but not carefully packed. They cannot say anything in reference to prices, as the *Oberhausen* is carrying about 1,100 cases of pears, a great deal of which is received by their competitors, the condition of which they do not know.

ROSEWORTHY AGRICULTURAL COLLEGE.

SOME EXPERIMENTS BEARING ON THE FEEDING OFF OF CEREAL CROPS WITH SHEEP.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College, and
W. J. SPAFFORD, Assistant Experimentalist.

(Continued from page 964.)

WHEATS.

In these experiments, in which it was sought to determine the influence on yields of cutting down a crop or feeding it off with sheep, the number of varieties of wheat tested throughout the three seasons was limited to two, namely, one early variety, Gluyas, and one mid-season variety, Jonathan.

GLUYAS WHEAT.

The 1908 results of the experiments on Gluyas wheat are summarised below in Table XXXII.

TABLE XXXII. - *Showing 1908 Data for Gluyas Wheat Cut Down in Various Stages of Growth.*

Seeding, April 3rd ; Germination, May 4th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain.	Total Produce.
1	Not cut	September 21	November 15	10.50	43.50
2	July 30	October 5	November 16	8.00	28.75
3	July 10	October 8	November 18	12.00	40.00
4	July 21	October 13	November 20	6.50	22.25
5	August 1	October 21	November 23	6.50	20.25

Table XXXII. shows, therefore, that in 1908, with the exception of plot 3, which is perhaps abnormal, the yields of Gluyas wheat were uniformly lower both in grain and in total produce when the crop had been cut down in early stages of growth, and this decrease in yields was all the more pronounced the later the crop was cut down.

The 1909 data are summarised below in Table XXXIII.

TABLE XXXIII.—*Showing 1909 Data for Gluyas Wheat Cut Down in Various Stages of Growth.*

Seeding, April 20th ; Germination, May 1st.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	September 18	October 28	17-00	85-00
2	June 11	September 23	November 12	20-00	83-00
3	June 25	October 5	November 17	7-00	36-00
4	July 9	October 12	November 20	5-00	27-00
5	July 23	October 19	November 24	2-00	11-00

The 1909 results, therefore, confirm those of 1908 so far as Gluyas wheat is concerned, *i.e.*, there is generally a marked decline in yields wherever the crop had been cut down, with the exception of plot 2, which shows a slight increase in grain yield.

The 1910 data are shown below in Table XXXIV.

TABLE XXXIV.—*Showing 1910 Data for Gluyas Wheat Cut Down in Various Stages of Growth.*

Seeding, May 18th ; Germination, May 27th.

Plots.	Date Cut.	Full Bloom.	When Ripe.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 4	November 16	6-13	42-00
2	July 9	October 6	November 16	6-13	46-00
3	July 25	October 6	November 20	3-19	27-00
4	August 8	October 12	November 22	1-38	20-00
5	August 18	October 18	November 24	0-81	7-00

Again, in 1910, Gluyas wheat suffered in yields when cut back in the early stages of its growth.

Finally, we have summarised below in Table XXXV. the average results of the three seasons (1908-10) for Gluyas wheat cut down in various stages of growth.

TABLE XXXV.—*Showing Average Results for Gluyas Wheat Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Total Produce	
				Total Produce. lbs.	in terms of Plot 1 taken as 100.
1	Not cut	lbs. 11-21	100	56-83	100
2	June 27	11-38	102	52-55	92
3	July 10	7-40	66	34-33	60
4	July 23	4-29	38	23-25	41
5	August 4	4-10	36	12-75	22

From the above data, which have been given graphic illustration in Fig.13, we note that when an early wheat, such as Gluyas, is sown somewhat earlier in the season than the average conditions of the district would warrant, the

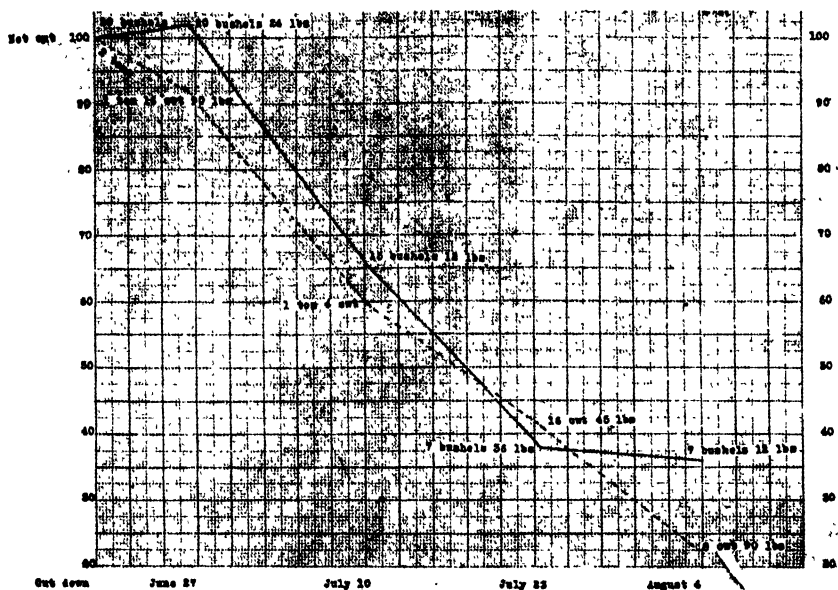


Fig 13 Showing Average Yields (1908-10) for Gluyas Wheat cut down in various stages of growth.

the grain yield of the crop appears to be slightly improved—about 2 per cent. by early cutting down or feeding off. On the other hand it is fairly clear that late cutting down or feeding off—extending into July in this district—is highly detrimental to yields both of grain and hay.

JONATHAN WHEAT.

Jonathan is a mid-season wheat, ripening its grain about a fortnight later than Gluyas. The 1908 data concerning this variety are shown below in Table XXXVI.

TABLE XXXVI.—Showing 1908 Data for Jonathan Wheat Cut down in Various Stages of Growth.

Seeding, April 23rd ; Germination, May 4th.

Plots.	Date Cut.	Full Bloom.	Ripening.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 21	November 25	15.75	47.50
2	July 8	October 24	November 27	9.75	37.50
3	July 16	October 26	November 28	11.50	40.00
4	July 24	October 26	November 28	8.50	29.00
5	August 3	October 28	November 28	4.25	16.25

Table XXXVI. shows very definitely that in 1908 the yields of Jonathan wheat, both as grain and as hay, did not benefit in the slightest from being cut down or fed off.

The 1909 data are summarised below in Table XXXVII.

TABLE XXXVII. *Showing 1909 Data for Jonathan Wheat Cut Down in Various Stages of Growth.*

Seeding, April 20th ; Germination, May 1st.

Plots.	Date Cut.	Full Bloom.	Ripening.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 18	November 19	15-00	87-00
2	June 11	October 19	November 21	12-00	64-00
3	June 25	October 19	November 25	6-00	48-00
4	July 9	October 20	November 28	5-00	35-00
5	July 23	October 24	November 29	4-00	26-00

Again, in 1909, the yields of Jonathan wheat sensibly declined wherever the crop had been cut down.

The 1910 data are summarised below in Table XXXVIII.

TABLE XXXVIII. *Showing 1910 Data for Jonathan Wheat Cut Down in Various Stages of Growth.*

Seeding, May 18th ; Germination, May 27th.

Plots.	Date Cut.	Full Bloom.	Ripening.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	November 3	December 1	2-94	28-00
2	July 11	November 7	December 1	2-38	25-00
3	July 25	November 7	December 4	2-69	31-00
4	August 8	November 14	December 10	0-81	22-00
5	August 18	November 14	December 10	0-81	18-00

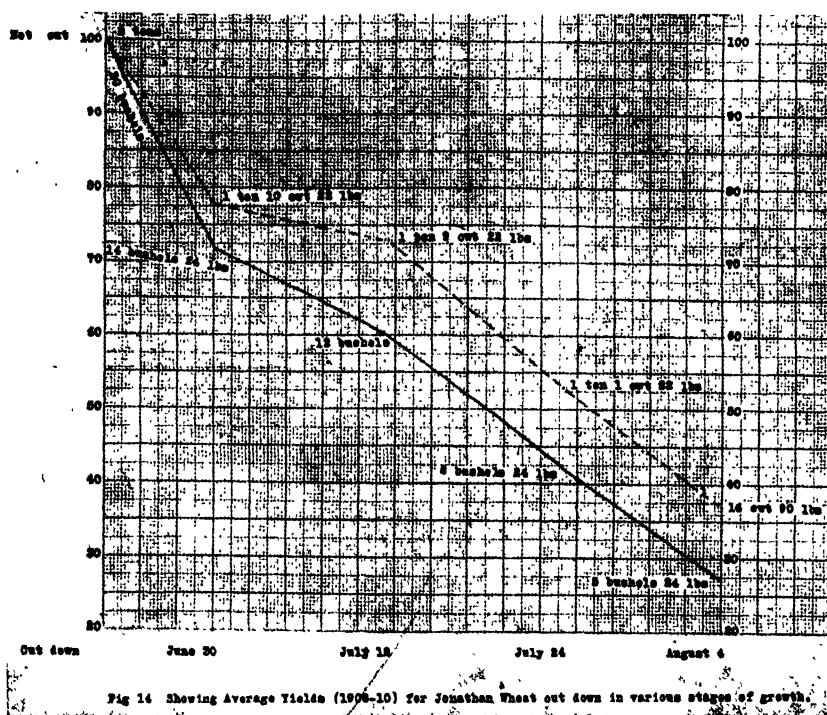
The decline in yields of plots that had been cut down in early stages of growth is again manifest in 1910. It seems probable that plot 3 is abnormal.

Finally, we append below in Table XXXIX. the average results of these experiments for the three seasons (1908-10) in so far as Jonathan is concerned.

TABLE XXXIX. *-Showing Average Results for Jonathan Wheat Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Total Produce in terms of Plot 1 taken as 100.	
		lbs.		lbs.	
1	Not cut	11-23	100	54-17	100
2	June 30	8-04	72	42-17	78
3	July 12	6-73	60	39-67	73
4	July 24	4-77	42	28-67	53
5	August 4	3-01	27	20-08	37

Taking the average of the three seasons, therefore, Table XXXIX. shows very clearly the heavy decline in yields that characterises the cutting down of a mid-season wheat such as Jonathan in this district, even when seeding has taken place early in the season. When cut down towards the end of June the decline in grain yield was represented by an average of 28 per cent., and



the decline in total produce or hay yield by 22 per cent. ; whilst when cut back towards the beginning of August the declines in yields were respectively 73 per cent. and 63 per cent. These average data are given graphic illustration in Fig. 14.

BARLEYS.

Two varieties of six-row barleys of our own breeding, namely, Short Head and Square Head, were submitted to similar experiments over the three seasons (1908-10). We submit below the data collected in this connection.

SHORT HEAD BARLEY.

The 1908 data concerning Short Head barley are summarised in Table XL.

TABLE XL.—*Showing 1908 Data for Short Head Barley cut Down in Various Stages of Growth.*

Seeding, April 22nd ; Germination, May 2nd.

Plots.	Date Cut.	Full Bloom.	Ripening.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	September 28	November 9	13.25	49.00
2	June 29	October 3	November 11	12.25	33.25
3	July 7	October 5	November 11	11.25	41.00
4	July 20	October 7	November 11	9.50	29.00
5	July 31	October 10	November 12	8.50	25.25

In 1908, therefore, the yields of Short Head barley declined perceptibly whenever the crop had been cut down in the early stages of growth.

The 1909 results are shown below in Table XLI.

TABLE XLI.—*Showing 1909 Data for Short Head Barley Cut Down in Various Stages of Growth.*

Seeding, April 21st ; Germination, May 1st.

Plots.	Date Cut.	Full Bloom.	Ripening.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	September 24	November 7	27.00	77.00
2	June 11	September 30	November 10	34.00	93.00
3	June 25	October 7	November 15	15.00	57.00
4	July 9	October 15	November 17	14.00	43.00
5	July 23	October 19	November 20	10.00	24.00

Table XLI. shows, therefore, that Short Head barley sown early in the season, and cut back towards the middle of June, showed a perceptible increase in yield both as grain and as hay over the plot that had not been touched, and this probably because of the unusual rankness of the latter. Later cutting down of the crop, however, resulted uniformly in very marked declines in the yields.

The 1910 data are shown below in Table XLII.

TABLE XLII.—*Showing 1910 Data for Short Head Barley Cut Down in Various Stages of Growth.*

Seeding, May 18th : Germination, May 27th.

Plots.	Date Cut.	Full Bloom.	Ripening.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 2	November 17	22.81	56.00
2	July 9	October 2	November 17	21.56	69.00
3	July 25	October 6	November 17	24.81	68.00
4	August 8	October 11	November 22	15.19	48.00
5	August 18	October 17	November 24	9.88	24.00

In 1910 Short Head barley appears to have benefited somewhat from being cut back in its early stages of growth ; to a limited degree only, however.

Finally, we summarise below in Table XLIII. the average results for Short Head barley over the three seasons.

TABLE XLIII.—*Showing Average Results for Short Head Barley Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Total Produce.	Total Produce in terms of Plot 1 taken as 100.
		lbs.		lbs.	
1	Not cut	21.02	100	60.67	100
2	June 26	22.60	108	65.08	107
3	July 9	17.02	81	55.33	91
4	July 23	12.90	61	40.00	66
5	August 3	9.46	45	24.42	40

Table XLIII. shows that Short Head barley, sown earlier in the season than is in ordinary circumstances advisable in this district, benefits in its yields both of grain and total produce to the extent of about 8 per cent. if

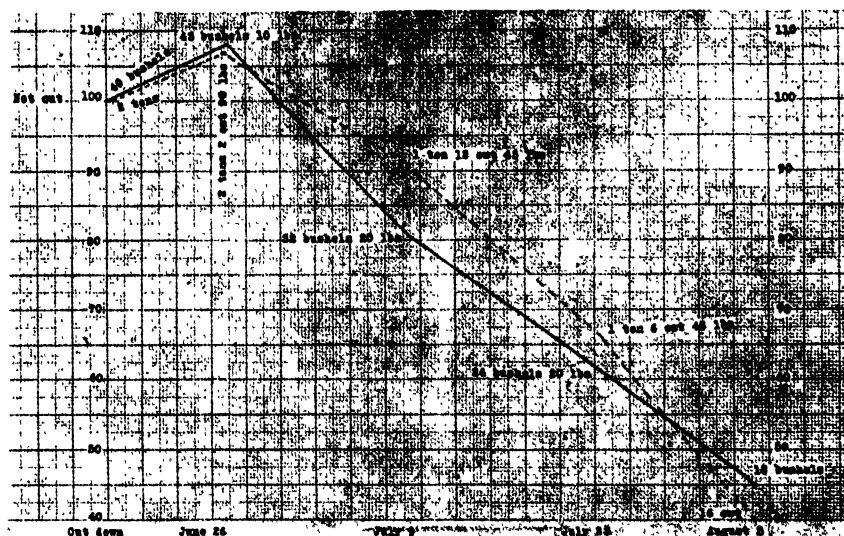


Fig 15 Showing Average Yields (1908-10) for Short Head Barley cut down in various stages of growth

cut back or fed down not later than the end of June. If the practice be resorted to in July, or later, there is immediately a perceptible decline in final yields. These data are given graphic illustration in Fig. 15.

SQUARE HEAD BARLEY.

This is another six-row barley of our own, somewhat earlier maturing than the preceding one, and making perhaps somewhat ranker growth. Its grain, however, is rarely as plump and well developed as that of Short Head

barley. The 1908 results concerning this variety are summarised below in Table XLIV.

TABLE XLIV.—*Showing 1908 Data for Square Head Barley Cut Down in Various Stages of Growth.*

Seeding, April 22nd ; Germination, May 2nd.

Plots.	Date Cut.	Full Bloom.	Ripening.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	September 23	November 6	13-00	49-00
2	June 29	September 28	November 8	14-25	41-25
3	July 7	September 30	November 11	15-50	41-00
4	July 20	October 10	November 11	13-00	34-25
5	July 21	October 12	November 12	12-00	30-25

Thus, then, this rank-growing variety of barley, sown earlier than is advisable for good grain crops, benefited from being cut down in the early stages of its growth as late as early July ; later cuttings, however, had a tendency somewhat to reduce the grain yields.

The 1909 results are shown below in Table XLV.

TABLE XLV.—*Showing the 1909 Data for Square Head Barley Cut Down in Various Stages of Growth.*

Seeding, April 21st ; Germination, May 1st.

Plots.	Date Cut.	Full Bloom.	Ripening.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	September 21	October 30	14-00	63-00
2	June 11	September 27	November 4	18-00	70-00
3	June 25	October 5	November 8	15-00	45-00
4	July 9	October 10	November 10	11-00	35-00
5	July 23	October 16	November 16	7-00	21-00

We have again to note a very distinct improvement in yields for Square Head barley in 1909 when cut down in the early stages of its growth, but a decline in yields when the operation is carried out late in the season.

The 1910 data are shown below in Table XLVI.

TABLE XLVI.—*Showing 1910 Data for Square Head Barley Cut Down in Various Stages of Growth.*

Seeding, May 18th ; Germination, May 27th.

Plots.	Date Cut.	Full Bloom.	Ripening.	Yields.	
				Total Grain. lbs.	Total Produce. lbs.
1	Not cut	October 2	November 14	15-81	50-00
2	July 9	October 4	November 14	14-69	49-00
3	July 25	October 6	November 14	14-81	47-00
4	August 8	October 12	November 14	5-38	19-00
5	August 18	October 17	November 20	0-81	4-00

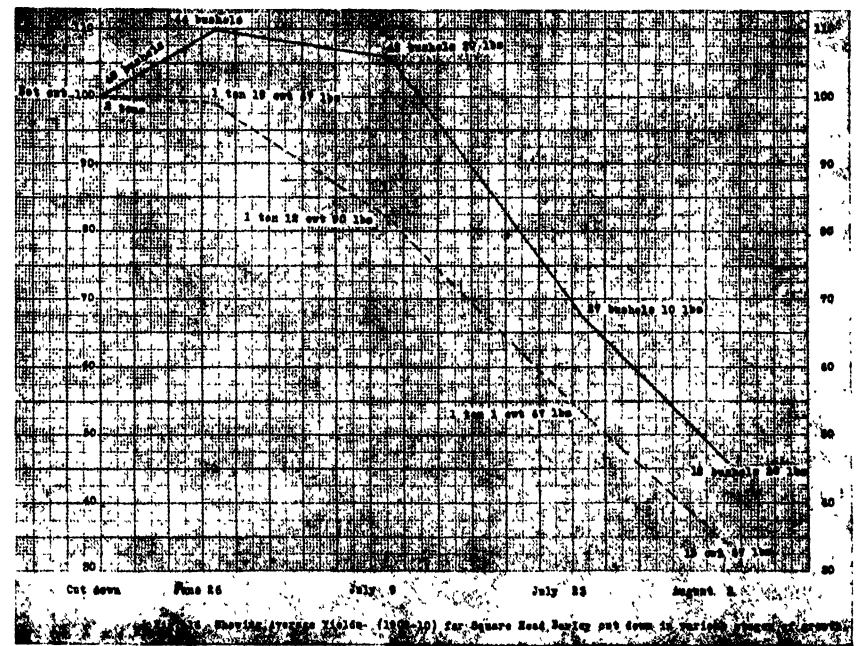
Table XLVI. shows that Square Head barley sown later in the season than was the case in 1908 and in 1909 did not in 1910 show any improvement in yield when cut down in the early stages of growth ; indeed, decreases in yields are perceptible throughout the series.

Finally, we submit in Table XLVII. a summary of the results of the three seasons.

TABLE XLVII.—*Showing Average Results for Square Head Barley Cut Down in Various Stages of Growth (1908-10).*

Plots.	Average Date of Cutting.	Total Grain.	Grain in terms of Plot 1 taken as 100.	Total Produce.	Total Produce in terms of Plot 1 taken as 100.
		lbs.		lbs.	
1	Not cut	14.27	100	54.00	100
2	June 26	15.65	110	53.42	99
3	July 9	15.10	106	44.33	82
4	July 23	9.70	68	29.42	54
5	August 3	6.60	46	18.42	34

We conclude, therefore, that so long as the first half of July is not allowed to pass by an early rank-growing barley, such as Square Head, may be cut down or fed off with advantage if it has been sown sufficiently early in the



season to render early feeding off possible. These average data are given graphic illustration in Fig. 16.

THE CONNECTION BETWEEN THE "SMUT" DISEASES AND THE FEEDING OFF OF CEREAL CROPS.

It is a well-known fact that all the cereals—wheat, barley, oats, &c.—are liable to the attacks of minute fungi, which, although specifically distinct for each cereal, are, nevertheless, known to us as a whole as "smuts," from the black sooty appearance of the mass of their spores or seeds. These spores germinate in the soil on the cereal seed itself, or in its immediate neighborhood, and by perforating the tender tissues at the base of the stem of the plant penetrate within the latter a few days after its germination. The parasite, therefore, is internal to the host plant throughout the growing period of the latter; it does not, however, make itself externally apparent until some time after the appearance of the "ear" of the cereal, when it assumes the characteristic appearance familiar to us all. For our present purpose it is necessary to recollect that so long as the cereal is growing the vegetative portion of the smut fungus is located within its stem; that as the latter makes upward growth the fungus progresses upward with it; that it gradually withdraws itself from the lower portions of the stem, finally concentrating itself in the ears, where it throws off millions of small black spores which, in the aggregate, make up the black sooty powder we know of. In the circumstances, therefore, it may be inferred that if a smut or bunt affected plant be cut down close to the ground after the parasite has begun to concentrate itself in the neighborhood of the ears, it may be inferred that the new shoots that spring up subsequently from the stock will be wholly free from any traces of the parasite.

We had a very good illustration of this fact on the Roseworthy Agricultural College Farm in 1905. We had under barley about 60 acres, the seed of which had not been pickled. Portion of this crop was cut down for green feed in the spring time after the appearance of the heads. Later on, at harvest time, although the bulk of the field was literally smothered in smut, not a single affected head was to be seen on that portion of the field that had been cut down for green feed and had made good second growth.

Bearing these facts in mind we endeavored during the course of these experiments to ascertain whether cutting back a crop in comparatively early stages of growth would have any influence on the proportion of "smutty" plants present at harvest time; hence, with this purpose in view, none of the numerous plots, the data concerning which have already been given, were pickled at seed time, and in 1908 and 1909 the smut-affected plants were carefully counted in each plot. It should be noted that throughout the wheat plots remained free from either smut or bunt, and the figures given below bear reference, therefore, to the oats and barley plots alone. The life histories of these parasites are, however, for all practical purposes identical, and inferences drawn relatively to the behaviour of barley or oat smut will in this case hold good for the loose smut of wheat or for bunt.

We submit below in Table XLVIII. data concerning the number of smut-affected plants found in 1908 and 1909 in the barley and oat plots.

TABLE XLVIII.—*Showing Number of Smut-affected Plants Found at Harvest in 1908 and 1909 Oat and Barley Plots Cut Down in Various Stages of Growth.*

Plots.	Average Date of Cutting.	Total Smut-affected Plants Present at Harvest.	Smut-affected Plants Present in terms of Plot 1 taken as 100.
1	Not cut	7,836	100
2	June 26	6,809	86
3	July 6	4,984	64
4	July 18	3,325	42
5	July 28	4,398	56

We may draw the following conclusions from the data set out in Table XLVIII. :—(1) The cutting back of a cereal crop, even as late as the end of July, but before the unsheathing of the ears, will not have the effect of eliminating completely all traces of smut or bunt from the crop; (2) the

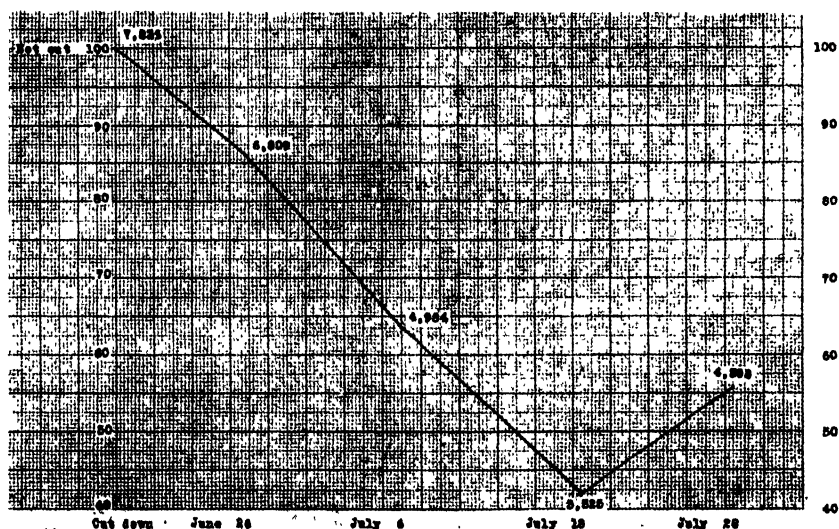


Fig 27 Showing Number of Smut affected Plants found at Harvest time in 1908 and 1909 Oat and Barley Plots cut down in various stages of growth.

cutting back of a cereal crop even as early as the end of June will have the effect of reducing considerably the proportion of smut-affected plants present at harvest time; and (3) the reduction in the number of smut-affected plants is all the more pronounced the later in the season the crop shall have been cut down. In this connection in our experiments this reduction in the numbers varied in a descending series from 14 per cent. to 58 per cent. of the

smut-affected plants present in the plots that had not been cut down. It should be added that our results present one anomaly which it is difficult to account for, except on the action of unknown factors abnormally affecting the results. Thus, although the decline in the number of smut-affected plants is regular enough from plots 1 to 4, plot 5 unexpectedly shows a greater number of diseased plants than plot 4, but still less than plot 3. We do not believe, however, that this single discrepancy should be taken to undo the results of two years' careful work in this direction.

We have given graphic illustration to the results of Table XLVIII. in Fig. 17.

FINAL GENERAL CONCLUSIONS BEARING ON THE PRACTICE OF FEEDING OFF CEREAL CROPS WITH SHEEP.

We have submitted in detail the data of these three years' experiments and, as occasion arose, have drawn attention to the facts they appeared to illustrate. We now propose summarising the conclusions we feel justified informing relative to the general practice of feeding off cereal crops in their early stages of growth.

1. In ordinary circumstances the practice of feeding off with sheep a well-grown cereal crop—wheat, barley, or oats—is not calculated to improve either grain or hay yields. In the great majority of cases, however, it is the hay yields that will suffer most.

2. If in the winter months a farmer, who has on his hands a valuable flock of sheep, finds himself temporarily short of feed, it may at times pay him to feed off his cereal crops lightly, whatever their condition, and notwithstanding the depressing influence of the practice on ultimate yields. It becomes then merely a matter of the just appreciation of relative values. If to maintain the flock in good condition is thought to be of greater importance than the depreciation in value of the crops that are fed off, then the practice is likely to prove a profitable one; if the reverse is judged to be the case, then feeding off with sheep must necessarily represent a distinct loss of revenue. In the majority of cases, in our view, it will prove more advantageous to feed the flock temporarily with chaff and bran.

3. Occasions, however, undoubtedly arise when cereal crops must be fed off or cut down if they are to yield at all normally at harvest time. This is always the case when crops are found to be making what local experience teaches to be over-rank winter growth. This exaggerated development of flag and culms may be the natural sequence of too early sowing, or of unusually mild winter conditions, or, again, of the exceptional fertility or condition of the soil. If, in the circumstances, a rank crop of this kind is left to itself, it may, in extreme cases, be beaten down flat to the ground, where it will partially or wholly rot away in the winter or early spring months. At other

times a rank crop may be no more than badly lodged at harvest time, and present in consequence considerable reaping difficulties. In all circumstances, however, a rank crop is extremely susceptible to blighting off under the first touch of summer weather, with the result that yields are invariably light and the grain ill developed, pinched, and light weighing. In these cases the remedy undoubtedly is to feed off the crop judiciously in the early stages of its growth; the second growth will spring up healthy and sturdy, and in ordinary circumstances yields at harvest time will be normal.

4. It is quite possible when feeding off a crop with sheep to do it more harm than good, even when the crop stands in crying need of being fed off. In other words, the crop must be fed off judiciously if good is to come of it. In this connection a few of the essentials may be quoted---

(a) Feeding off, when determined upon, must never be put off too late in the season. Reference to the tables given throughout this report, and the figures illustrating them, will show very clearly how heavy is the decline in yields whenever late feeding off is resorted to. On this question it must be left to individual districts to determine within what limits lies the margin of safety. For the district in which we are situated we have no hesitation in stating that the last week in June represents the extreme limit in this direction for average seasons, and the first week in July for unusually favorable seasons with wet springs. One of the chief disadvantages of late feeding off is that by putting back unduly the period when the crop should normally come into full bloom, it has the effect of changing it from an early variety into a mid-season one, or from a mid-season variety into a late one; and the decline in yields is then very largely proportionate to the extent that the change brought about does not meet the known requirements of the district in which the crop happens to have been sown.

(b) The crops should be fed off as rapidly as possible by crowding into the field as large a flock as can be secured for the purpose. In this connection, for example, it is better to make use of 20 sheep to the acre for three days than 10 sheep to the acre for a week. The flock should never be left in the field sufficiently long to make tracks through it.

(c) The crops should not be fed down in wet weather, particularly if the soil is at all heavy in character.

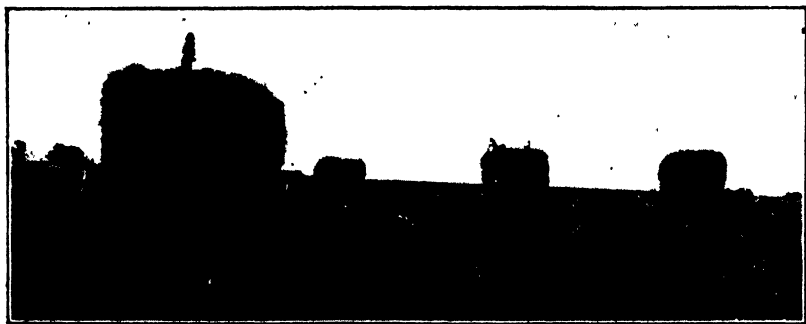
(d) When feeding down a crop, particularly a barley crop, it is as well to avoid heavy frosty weather as much as is practicable.

5. Judicious feeding off may have the effect of saving a crop that is growing too rankly. On the whole, however, it is generally better policy to endeavor to anticipate this tendency to rankness of growth by avoiding unduly early sowing, or too thick sowing, or soils known to be in too high condition for cereals. Feeding off would then in ordinary circumstances remain our answer to the exceptional mild winter conditions which we cannot control.

6. There is the case of those who sow cereal crops specifically for feed purposes, and for whom, therefore, the harvest is no more than a meagre aftermath of the crops they sow. Evidently in such cases the flock is of greater importance than the crop. When such is the case there must, however, be much to be gained in adhering to those cereals which on the whole respond best to the feeding off test. Our experiments in this direction were no doubt very limited. In a general way, however, it may be stated that most barleys and ryes stand feeding off better than the other cereals. Among the oats we tested, Calcutta and Algerian oats appeared to give the most satisfactory results, whilst the two wheats we had in hand did not appear to relish feeding off to any extent.

In a general way if crops are to be sown specifically for feed, the earlier in the season they are sown the more satisfactory are they likely to prove. In the same way early rapid-growing varieties should always receive preference over later ones. It is, however, idle to expect that these crops will yield harvest returns at all equal to normally-sown crops that are not fed down with sheep.

7. Finally, we may note that although feeding down does not altogether eliminate smut or bunt from a crop, unless continued until the time when the ears of the cereal begin to leave the sheaths, it will certainly reduce very considerably the proportion of smut-affected ears present at harvest time.



Haymaking.

EUCALYPTUS OIL.

INQUIRIES BY THE TRADE COMMISSIONER.

Writing on the above subject, Mr. G. A. W. Pope, General Manager of the Produce Department, states—

Kangaroo Island has long been famed for the quality of the oil produced from the narrow leaf eucalyptus tree (*E. cneorifolia*), but as an industry its distillation cannot be said to have prospered, owing to the absence of an export trade capable of absorbing quantities sufficient to allow distillers to adopt the most scientific methods and erect the necessary expensive plants to economically and profitably produce the oil.

Many distillers have approached the Government seeking assistance for increasing the demand in the United Kingdom, and in order to facilitate this export trade the department has undertaken to make a thorough test of the English markets for the sale of eucalyptus oil. The experience already gained in this direction during the past 12 months shows that there are many improvements and alterations necessary before Kangaroo Island eucalyptus oil will be valued as a family remedy in England to the extent it is in South Australia.

PRESENT DEMAND.

At the present time the sale of eucalyptus oil is almost entirely limited to the business of English chemists. These chemists are not advertisers, because the majority of their business comes through the recommendation of medical practitioners and others, and those lines which are not “drugs” in the ordinary sense are generally so advertised by the manufacturer that the public are educated to their value, and thus they become a line which the chemists can sell freely. Eucalyptus oil has never been advertised along these lines, and consequently the British public as a whole are not alive to the advantages of the oil.

The result is that when a chemist stocks the oil his profits on the little he sells must be large, because his sales are limited and his annual turnover small.

ADVERTISING.

Having gained this experience from his investigations, the Trade Commissioner commenced a campaign of advertising. His scheme has been to make eucalyptus oil a feature of the exhibits of South Australian produce at various shows throughout England, and the course adopted at these shows is—

- (1) To show the bottled oil on a stand.
- (2) To offer the oil for sale to the visiting public at 6d. a 2oz. bottle.

- (3) To issue "dodgers" from the stand setting forth its virtues.
- (4) To arrange with shops in the town visited to stock it, giving the names of these firms on his "dodgers."
- (5) To advertise on all the bottles and all placards the fact that it is guaranteed pure under a South Australian Government certificate of analysis, and made from the Kangaroo Island narrow leaf eucalyptus.

TRADE THROUGH GROCERS.

Major Norton has spent a very considerable time amongst the grocers of England, and by lectures to their societies and exhibits at their shows has come in close touch with the men behind the retail grocery trade of England, and, as a result of knowledge thus gained, he now strongly advocates the introduction of these people to the eucalyptus oil trade as being the very best additional avenue through which the producer can expect to enlarge the trade with the population of the United Kingdom.

The nucleus of this propaganda is, of course, that the publicity given the oil at the exhibitions will induce the public to at least purchase a sample bottle, the grocers stocking it from the medium through which the public can obtain further supplies, and that at the popular price of 6d. a bottle it will favorably commend itself. The success of the scheme, however, is to a very large extent in the hands of the distillers, as they must make the oil a profitable line for the grocer to handle and advertise by reducing the very many qualities now produced to one proper common standard, and pledge themselves to a continuity of supply.

Already the Trade Commissioner has felt the disappointment that irregular qualities and supplies create, and while his preliminary campaign amongst the grocers and public has been very successful and promising, future business is absolutely dependent on some combination amongst the distillers.

THE OIL REQUIRED.

For the special class of household trade which will be reached through the English retail grocery business, the distillers must be prepared to supply a uniform oil equal to the standard set by the British Pharmacœpia. It must also contain not less than 60 per cent. eucalyptol, properly refined, and of a good water-white color.

The distillers are recommended to carefully study the particulars contained herein, as the Trade Commissioner is emphatic in his statement that with the co-operation of the producers there is every possibility of building up a very profitable industry, while a continuation of the present haphazard shipments of irregular qualities of oil cannot bring about an improvement of trade, which is so urgently desired.

THE LAMB AND MUTTON EXPORT TRADE.

By G. A. W. POPE, General Manager Government Produce Department.

The position of the frozen meat trade of the world to-day is one that should be very encouraging to all Australians interested, and it is certainly very satisfactory to all those countries who are in a position to ship their surplus fat stock to the various markets.

Figures are more significant than words, so that the comparative statement given below of the average prices made on the Smithfield markets for Australian lamb and mutton during the years 1911 and 1912, showing that the trading of 1912 was at an advanced price over 1911 of approximately $\frac{3}{4}$ d. per pound all round, is a very good evidence of the buoyancy of the trade—

<i>Australian Mutton—</i>	1911.		1912.		Increase 1912.
Light—40lbs. to 50lbs.	3-18	..	3-80	..	-62
Heavy—50lbs. to 70lbs.	3-07	..	3-26	..	-19
Ewes—30lbs. to 50lbs.	2-91	..	3-55	..	-64
<i>Australian Lambs—</i>					
G.A.Q.	4-27	..	5-11	..	-84
F.A.Q.	3-97	..	4-87	..	-90
Seconds	3-81	..	4-52	..	-71

The general position in all departments of trade in England is in an unusually satisfactory position, so that an improved demand for all classes of produce should prevail during the present year throughout the United Kingdom.

Frozen meat continues to gain a firmer foothold in Europe generally, and the figures show that the trade has grown from 17,661 tons in 1911 to 20,368 tons during 1912. Australia particularly should reap many advantages from the large experimental shipments of mutton already forwarded to the German markets.

The exportation of fresh meat from the United States has almost ceased, and it is reported that some importations from Australia are now finding their way into their western States.

These statements deal with the position from the standpoint of the consuming countries, and when it is further stated that traders generally consider that the requirements have fully overtaken the visible supplies, the prospects of the industry from a producer's point of view are very favorable, and a continuation of the present selling rates can confidently be expected.

SOUTH AUSTRALIA.

In view of the soundness of the meat markets of the world, the statistical position of the South Australian trade calls for more than passing comment.

In the first place, official figures show that the State's flocks have been reduced from the maximum of 6,500,000 to 6,175,971 for 1912, while the following table draws attention to the gradual shrinkage in our export trade:—

Year.	Lambs.		Hoggetts.		Mutton.		Season's Total.
	Depot.	Privately.	Depot.	Privately.	Depot.	Privately.	
1895-6..	1,751	—	—	—	1,097	—	2,848
1896-7..	10,606	—	—	—	675	—	11,281
1897-8..	3,534	—	—	—	463	—	3,997
1898-9..	38,620	—	—	—	2,052	—	40,672
1899-00..	89,980	—	—	—	1,334	—	91,314
1900-01..	94,597	—	—	—	7,122	—	101,719
1901-2..	45,440	47,134	—	—	—	—	92,574
1902-3..	63,798	53,045	—	—	19,464	18,656	154,963
1903-4..	64,930	91,436	—	—	10,521	10,390	177,277
1904-5..	155,858	37,822	—	—	2,254	311	196,245
1905-6..	163,819	87,750	—	—	—	—	251,569
1906-7..	161,066	66,317	—	—	2,613	434	230,430
1907-8..	198,687	72,942	—	—	4,490	—	276,119
1908-9..	184,345	82,692	5,526	851	50,090	17,532	341,036
1909-10..	120,863	33,536	406	98	35,401	64,195	254,499
1910-11..	195,436	—	2,981	—	43,116	—	241,533
1911-12..	132,062	—	638	—	72,458	—	205,158
1912-13..	108,904	—	6,253	—	81,786	—	196,943
Totals .	1,834,296	572,674	15,804	949	334,936	111,518	2,870,177

The small advance in the quantity of mutton exported is more than swallowed up by the decrease in lambs, and the whole position is 144,093 carcasses worse than the 1908-9 record year.

LAMBS.

Although a terrible failure, the final figures for the past season surprised those who were so despondent at the commencement—down to June last there had been practically no rain through the country, and it was continually being reported that owners were obliged to kill their young lambs in the hope of saving the mothers. Many farmers lost both lambs and ewes, and others only saved their sheep by hand-feeding.

Through unfavorable climatic conditions generally the percentage of lambing was a very low one, and altogether the season was disastrous.

HOGGETTS.

There was an unusually large quantity of meat shipped under the heading of "tegs," the usual local description of which is summer lambs or hoggetts.

The English market for this class varies very considerably, as it will sometimes take the meat as lamb, but at other times no better prices are offered than those ruling for light mutton.

MUTTON.

A strong English market gave exporters a good buying power, and it is therefore not surprising to find the quantity exported reaching a total which is almost a record for the State. This mutton trade is of immense value, as it keeps exporters in the field for a considerable portion of the year, thereby levelling up markets all round.

QUALITY.

The quality of the meat exported is best shown by tables setting out the weight and grading of the numbers shipped.

The following table gives the average weights for several years : —

Lambs.

Year.	Depot.	Private.	Year.	Depot.	Private.
	Lbs.	Lbs.		Lbs.	Lbs.
1901-2	33.13	—	1907-8	32.93	33.30
1902-3	32.02	—	1908-9	33.70	33.90
1903-4	34.97	—	1909-10	33.56	33.05
1904-5	35.22	—	1910-11	34.50	—
1905-6	37.07	35.57	1911-12	33.50	—
1906-7	33.70	33.40	1912-13	32.19	—

Mutton.

1908-9	45.72	42.28	1911-12	42.36	—
1909-10	44.99	38.68	1912-13	42.61	—
1910-11	49.50	—			

The following table is a grading record : —

Lambs.

	Depot.				Private.			
	First.	Second.	Third.	Rejects.	First.	Second.	Third.	Rejects.
1904-5....	135,868	21,657	—	1,796	—	—	—	—
1905-6....	114,426	45,850	—	2,359	51,287	12,108	2,229	609
1906-7....	94,255	67,603	1,961	4,391	20,484	46,871	19,210	2,387
1907-8....	95,827	97,533	5,327	9,884	34,619	33,719	4,646	1,948
1908-9....	74,798	82,274	27,273	7,702	23,925	44,380	14,387	2,929
1909-10....	69,159	42,511	9,193	5,169	5,664	21,930	4,778	566
1910-11....	98,285	81,636	15,515	6,018	—	—	—	—
1911-12....	71,086	45,287	15,689	4,958	—	—	—	—
1912-13....	38,621	50,682	19,601	4,157	—	—	—	—

Mutton.

1908-9....	15,035	35,055	—	1,923	4,988	12,544	—	732
1909-10....	26,318	9,083	—	4,351	15,754	49,899	—	3,411
1910-11....	32,909	10,207	—	876	—	—	—	—
1911-12....	24,634	47,824	—	926	—	—	—	—
1912-13....	32,517	49,269	—	2,451	—	—	—	—

These figures plainly show the effect of the poor lamb season, for the average weight has dropped nearly 1½lbs., and the majority of the shipments were composed of only fair and second grade meat.

REJECTS.

The percentage of rejects during the season has been heavy, although not unusually so, and a comparison with past seasons can be gathered from the following table :--

Lambs.

1904-5	1.12	..	
1905-6	1.45	..	0.90
1906-7	2.66	..	2.68
1907-8	4.60	..	2.30
1908-9	3.85	..	3.42
1909-10	4.10	..	1.71
1910-11	2.98	..	
1911-12	3.61	..	-
1912-13	3.60	..	

Mutton.

1908-9	3.68	..	4.04
1909-10	10.94	..	4.09
1910-11	1.99	..	
1911-12	1.30	..	
1912-13	2.51	..	

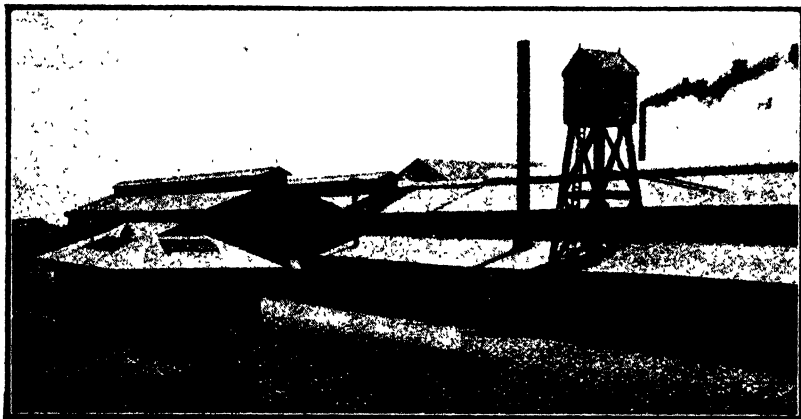
Causes of Rejection. Five thousand seven hundred and sixteen quality too poor or too small, 416 multiple abscess, 314 bruised badly, 54 diseased and condemned, 38 grass-seeds, 27 yellow in color, 21 dead in trucks, 19 deformed, three staked.

PROSPECTS.

The splendid prices realised for both lambs and sheep during the past season have undoubtedly encouraged producers, while on the other hand the absence of green feed during the last lambing makes them very cautious in restocking operations.

The position at the present time is that many farmers are without the necessary ewes for breeding purposes, and, therefore, the prospects of obtaining greatly increased export quantities during the coming season are not at present so favorable as could be desired. A heavy lambing percentage is urgently needed to recover lost ground, and while rain still holds off fears are expressed as to the consummation of this desire.

In addition to an increase in quantity the question of quality requires attention. In one really good grass year 163,819 lambs shipped from South Australia averaged 37·07lbs., while the number sent last year only averaged 32·19lbs., therefore it is surely advisable to study the problem of growing green fodder. The difference in the value of a good lamb and a bad one is at least 5s. a head, and that difference is worth striving for.



Government Produce Export Depot.



Shipping Frozen Carcasses.

SHEEP ON THE FARM.

By HENSHAW JACKSON, Wool Expert, S.A. School of Mines and Industries.

(Continued from page 1114.)

In a sheep country, such as Australia, it is somewhat anomalous that, taken as a whole, her meat as regards quality and flavor, is mostly a reproach to the producers of it. This fact twenty years ago was not of very great importance, so far as the general prosperity of sheep-owners was concerned; their returns were obtained in the wool market, and their interest in the palate and digestion of the meat-consuming public, if any, was microscopical. There was then no particular inducement to keep the meat market supplied regularly with drafts of prime sheep, nor was the public at that period so discriminating in its taste, or as numerically large. The consequence of this has been considerable want of progress along the lines of improving sheep with regard to excellence of mutton.

To-day we are faced with an entirely different set of conditions, that opens up an almost limitless field for enterprise in sheep-farming. The overseas markets for mutton appear to be extending in every direction, while local consumption is not by any means decreasing, and both avenues of profit are available to the men who will produce what those markets call for. The average sheep produced in Australia, however, is not the article "to fill the bill." Though individual instances of excellence occur often enough to merit special competition in the sale yards, all round excellence is still far from being attained. This at once leads to the question—How is the higher standard to be reached? To my mind the solution is largely in the hands of the small sheepfarmers. This is at once a comfortable and dangerous assertion, from the fact that very often what is nearest to hand is least availed of. Nevertheless, provided our agriculturists who combine sheep with their other operations will set themselves to study the animals in the same way as they have applied themselves to grain and hay, the outcome will be larger production of better and more valuable sheep and wool.

SHEEP HUSBANDRY.

Unfortunately, in Australia, we have not as yet undertaken any systematic inquiry on sheep husbandry, apart from agriculture, that is, say, sheep have not been studied by themselves sufficiently to enable us to say what methods are generally applicable under varying conditions. We know, of course, that Merino sheep do well almost anywhere in the back country under good and bad conditions, and so far as that type of sheep is concerned he may be

safely left in the hands of those who have been and are breeding him to-day. Regarding the British breeds, we all have our fancies, but very few facts and little or no data as to the profitableness or otherwise of any of them. New South Wales has, perhaps, done more than any other State in this direction, but her tests have not yet developed much farther than a sort of go-as-you-please competition between the different breeds and their crosses—very valuable, but hardly far-reaching enough, and so far as definite information is concerned nothing like the work that has been done in relation to wheat.

On a farm or agricultural holding where sheep are kept nothing is so strongly indicative of its character and solidity as the sheep that are on it. It is only a truism to remark that profitable sheep culture is synonymous with profitable farming, both the product of the land and the land itself being materially advanced in value by reason of good sheep husbandry.

When our sheepfarmers get round this fact and face it with an inquiring mind we are going to progress; those who don't want to face it are going to be badly left. The situation is perfectly clear. The improvement above mentioned has taken place largely in connection with the rearing of mutton sheep. In order to feed these larger and heavier animals something more than natural herbage was required, and it became necessary to make "the earth give up her increase" in the shape of various fodder crops, which entailed good tillage, clean cultivation, and liberal manuring, all of which vastly increased the product of the soil and improved it. Thus, because of the need of the sheep, we benefit ourselves, our land, and the public.

WHAT SUCCESS DEMANDS.

I would like to say just here that in these articles dealing with sheep on the farm no recipes for success will be found, and no sign boards pointing out the "royal road." There is plenty of success available, but there is no "royal road," and I know of no recipes other than an intelligent farmer can formulate with his head and put into practical application with his hands. These writings are purposely to try and interest our farmers in sheep for all that they are worth as factors in successful holding and working land—to try and induce every farmer who can carry even 100, or 50 sheep, to do so, but to do it intelligently and with a purpose other than that of using the animals as a kind of animated lawn mower for cleaning stubble and fallow land. They will do more than that if handled properly and the right sort are reared; they will provide meat for the home and the market, fertiliser for the land, packages in which to send off the farm a good deal that is at present going to waste, and some wool to pay the rent.

One factor that militates against sheep on farms is that they are, as a rule, nobody's special care. We do not have shepherds in Australia, and yet in almost any farmer's family it would be possible to find one of the boys who would be willing to devote himself to their well-being if he were allowed,

and it was realised that his time was not wasted in so doing. The area on many farms in South Australia that could be exclusively devoted to a small flock of sheep is surprisingly small and would not affect the wheat or hay yield at all detrimentally, while the returns from a flock properly cared for and *fed* would most certainly show a credit balance in the profit and loss account of the farm.

That this is true there can surely be very little doubt. Under our present conditions of running sheep on farms, which, to say the least, are neither ideal nor systematic, good profits are recorded; and it might even be hazarded that all things considered the biggest return from capital invested comes from sheep.

AN EXPANDING MARKET.

Any encouragement that can be given to sheep rearing and cultivation at the hands of our farmers is national in importance and deserves the most serious consideration by all concerned. At the present time nothing seems to offer a greater scope for development. The sheep of the world are decreasing, while the demand for wool and mutton grows larger every year, and Australia stands alone as the main source of supply.

The improvement of the farm sheep and full development of its usefulness is not going to take place in a year, or two years, but it must come; meanwhile it waits upon an intelligent comprehension by those who can and will study its possibilities as a national asset.

So far as the Merino is concerned, at the moment he is supreme, and in regard to wool production and as a means of occupying our out-back areas and bringing them into profitable use will remain undisturbed. In relation to agriculture, the Merino stands as half the flock only; the other half must necessarily be sheep of the English breeds, some or other of which are suitable in combination with him under all the varying conditions which obtain in various parts of the State and which can be more profitably discussed in the next article under the heading of "British Breeds of Sheep."

(To be continued)



Camel Team, Oodnadatta.

DISEASES OF FARM ANIMALS.

DIGESTIVE AILMENTS OF CATTLE.

By F. M. JONES, L.V.Sc., Assistant Government Veterinary Surgeon.

(Continued from page 1030.)

The preceding article dealt with common digestive ailments in calves. The present proposes to deal briefly with some ailments associated with the digestive apparatus in cattle.

The art of diagnosing cattle diseases depends on the personal ability to interpret signs shown by these animals. The first signs we are familiar with are naturally those of healthy animals, *i.e.*, feeding, breathing, appearance of eye, condition of coat, character of discharges, &c. Any alteration in these normal signs are naturally attended with a corresponding alteration in the degree of health. Salivating or "slobbering," depraved appetite, arrested rumination, hoven or "blown," &c., have their peculiar significance to the careful observer.

SALIVATION—"SLOBBERING."

This results from a too copious secretion of saliva. It may be a symptom of some general or local disorder. In countries affected with foot and mouth disease it may signify a general disorder; or, again, when an animal obtains and ingests some irritating plants, the increased flow betokens a local trouble. Sometimes a foreign body, like a piece of wood gets fixed across the palate and between the back molar teeth, or it may be a needle or splinter of wood gets embedded in the tongue. Mouldy hay may produce this symptom. Drugs, such as mercury, which have been used as an ingredient in the composition of a blister, if licked by the animal may produce the trouble. This drug, it must be remembered, is easily absorbed through the skin of cattle, and it is possible for them to show signs of poisoning, even without licking it themselves.

Treatment.—If the cause be due to ingestion of acrid plants or forage possessing some stimulating property, change the food and use a lotion composed of loz. of alum dissolved in a quart of water; syringe into the mouth twice daily, using half a pint each time. If due to a splinter of wood, thorn, &c., remove the offending object and wash the mouth with a solution of boracic acid.

DEPRAVED APPETITE.

Cattle suffering from this disease have a capricious and variable appetite as regards their ordinary food, but show a strong desire to lick substances for which healthy animals have no inclination. Alkaline and saline tasting substances are specially attractive to cattle with depraved appetites, and they frequently lick lime, earth, gravel, bones, and even dung of other animals. Cows in calf and young cattle are especially liable to develop these symptoms. Animals so affected lose condition, their coats stare, and gait is slow. The milk of such animals is thin and watery. Such animals get uneasy and restless, as is often shown by their incessant bellowing. This disease may last weeks, or even months. The animals ultimately become emaciated and exhausted. Depraved appetite frequently precedes the condition in which the bones of cattle become brittle and fracture easily.

Causes. As it often occurs in definite areas this would seem to suggest that some condition of soil and water and local vegetation is responsible for it. It has been especially observed in parts where soil is depleted. Swampy ground seems to predispose grazing animals to it. Occasionally one animal in a herd suffers, although all are fed alike. This is due, evidently, to imperfect assimilation on part of animals affected of the nutritive elements of the food supplied.

Treatment. Improve process of digestion and supply animal with sufficiency of sound and wholesome food. Give tablespoonful of the following three times a day: Carbonate of iron 4ozs., fine bone meal 16ozs., powdered gentian 4ozs. Mix together and give quantity as directed. Also give an ounce of powdered charcoal in food daily. Rock salt should be placed accessible for animals.

ARRESTED RUMINATION.

"Losing the cud" is a common expression amongst farmers and cattle folk when an animal ails and refuses to eat. This is simply arrested rumination due to a digestive disturbance. It is a sequel rather than a cause in itself. It is a symptom accompanying a great many disorders and should not be overlooked or regarded as too trivial for observation.

HOVEN OR "BLOWN."

This disease is characterised by a swelling of the left flank, and is caused by the formation of gas in rumen or paunch.

Causes.—Any kind of food that produces indigestion may produce this condition. Animals first turned into young clover may eat too greedily, and so produce it. Turnips, potatoes, cabbages may cause it. An excess of the foregoing food may produce this disorder, or food too hastily eaten, although not excessive in amount. Sometimes the quality of the food is at fault. Wet grass or clover, due to rain or dew, may produce hoven when food is eaten too hastily; digestive function is arrested or only imperfectly

performed, and food contained in paunch ferments, during which large quantities of gas is formed. The same may result if an animal becomes choked as the obstruction in the gullet prevents eructation or passage up of gas from stomach, so that gas continues to accumulate until tympanitis or hoven is produced.

Symptoms.—Swelling of left flank is characteristic; often the flank at its upper part rises level with backbone, and when struck with fingers emits a drum-like sound. The animal has an anxious expression, moves uneasily, and is evidently distressed. If relief be not obtained in time it breathes with difficulty, reels in walking or in standing, and in a little while falls down and dies from suffocation. The distention of stomach may be so great as to prevent the animal breathing. Cases have been recorded where complete rupture of stomach has resulted from this cause.

Treatment. If case be mild, walk the animal for 30 minutes, throw cold water on animal's sides. Give 4ozs. of carbonate of soda in pint warm water as drench. In urgent cases tap the sides with a trochar (a trochar is a sharp-pointed instrument enclosed in a sheath, which leaves the point free). The proper spot to plunge your trochar, or ordinary butcher's knife, is between the last rib and the point of hip-bone, taking a span of your hands and directing your thumbs downwards. The figure so described is a letter V. The exact spot for inserting your trochar then is the lowest part of this figure. A good plan is to first nick the skin at the point for $\frac{3}{4}$ in. before inserting your instrument. After plunging, withdraw the trochar, leaving the sheath behind. This tube may be left as long as any gas continues to escape. Direct your instrument, or knife, downward, inward, and forward, so as to penetrate the walls of the stomach. Give the following internally: Two ounces of aromatic spirits of ammonia in a pint of tepid water; repeat in half an hour; or you may give $\frac{1}{2}$ oz. of chloride of lime in a pint of water; repeat every half an hour till bloating ceases. Common baking soda is a good thing to give — 4ozs. to pint warm water. Follow up treatment with 20ozs. of Epsom salts, 1oz. ground ginger to pint warm water, to be given as drench.

TRAUMATIC INFLAMMATION OF STOMACH.

This is a condition caused by a foreign body in the stomach, and is not by any means rare. These animals swallow their food without chewing, and so nails, wire, hat pins, wood, bones, &c., often find their way into the stomach. A frequent cause may be traced to the source of food supply, viz., feeding animals on market or mill sweepings. The writer recalls a case in point during the last fortnight. The animal, a cow, had been ailing and was eventually destroyed; a *post-mortem* examination revealed the presence of half a pound of $2\frac{1}{2}$ in. wire nails in the stomach, some of which had penetrated through the diaphragm and entered the lung, giving rise to lung symptoms. This animal, with others, had been fed on mill sweepings as a supplementary

food. Care, therefore, should be exercised in the examination of this class of food for the presence of foreign and injurious substances.

These objects reach the second stomach where they become caught up in the folds of the mucous lining, and in some instances the walls of this organ may become perforated. Occasionally a piece of wire or a nail may penetrate forward through the diaphragm to the pericardium, or heart sac, or as already stated, into the lung, giving rise to complicated symptoms.

Symptoms.—These generally are pain on getting up or down, grunting and pain upon sudden movement (especially down a decline), coughing, pain on pressure over seat of second stomach (that is on right side behind, but above the elbow). Sometimes a small swelling is noticed at the part which, on being closely examined, may reveal the projecting end of a piece of wire or nail, &c.,

The most profitable way of dealing with an animal like this is to slaughter for beef, providing no fevered conditions be present.

GASTRO-INTESTINAL CATARRH.

(Known as Dyspepsia or Indigestion.)

In this trouble you do not always get the bloated condition or collection of gas in stomach as in hoven.

If indigestion goes on for any length of time, the irritant products produce catarrh of stomach and intestines, and spoken of as gastro-intestinal catarrh. Irritant substances in food may give rise to catarrh, and this in turn produce indigestion, so that many conditions may be found existing together.

Causes.—It often appears toward end of a dry season, so that a deficiency of water may be regarded as a condition favorable for its development. Damaged food, an excess of food, or food that is too fibrous or woody, and, therefore, indigestible, may cause this trouble. Irritant plants ingested may produce this disorder.

Symptoms.—Loss of appetite, irregular rumination, dung not only may smell badly, but may even be streaked with mucus. Dullness, fullness of flanks, animal grunts when breathing, ears and horns hot and cold alternately, often get diarrhoea and constipation alternating. Sometimes passage of dung is arrested and only a little mucus is discharged. This condition may last a few days or weeks.

Treatment.—If hand-feeding, reduce amount of hard feed. Supply, if possible, greens, but in moderation. If costive state be present, give following:—1lb. Epsom salts dissolved in quart of linseed tea and pint of molasses. If, when bowels have acted, there be a loss of appetite give following:—Hyposulphite soda, powdered gentian, pot. bicarb., ginger, 3ozs. of each; divide into 12 powders; one three times a day in feed.

POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

OPERATIONS FOR JUNE.

In last month's notes (May issue) the general question of cold weather conditions was discussed. Housing and feeding were the subjects principally dealt with, and a little was said about breeding. A question of some importance to most beginners is that of *Breed*, and which of the many breeds and varieties are to be recommended. In dealing with the subject from a commercial or utility point of view, there is no need to detail the good and bad points of each variety, but it is desirable to point out that there are two branches of pure-bred poultry - *the Utility and the Fancy* - and even these broad divisions need some dissection for reasons to be stated. If a novice reads a poultry book, and also some of the poultry papers, he becomes bewildered, because all the merits of each breed and variety are accentuated, and any defects and deficiencies are lightly passed over as beneath notice. Then, again, enthusiastic introducers and breeders of new varieties may or may not be in a position to compare the merits of their favorites with those of tried standing. Then there is the commercial instinct to boom and sell, even if the face value is but a paper one.

Notwithstanding the fact that comparatively few varieties and breeds have undergone rigorous test, it is quite possible and probable that some of the "untried" will prove of great value, but they must prove their value first.

Again, of the tried breeds there are distinct types or grades, each grade differing from another in point of commercial utility. We have the two main considerations for discussion - egg production and flesh production. One must discard fads and preferences, and allow due discount of the statements of interested parties.

In general, we divide the recognised breeds of fowls into the following classes :—

COMMERCIAL OR UTILITY BREEDS.

For Egg Production only. White Leghorns (Australian laying strains). These are first and foremost. The breeds and varieties still to be proven are Brown, Black, and other Leghorns. The old-time Minorca had a fine reputation, but the breed is sadly decadent, and good laying strains are not to the fore. The Andalusian presents too many difficulties in breeding, and, further

no one seems to be doing any good development work. Campines, Anconas, and other layers of eggs of marketable size are in the same category.

For Flesh Production. --It may generally be stated that even if certain breeds are kept to produce good market chickens, a fair yield of eggs will always weigh in favor of any breed. It must be remembered that some of the modern heavy breed fowls lay well enough during their pullet year--say until 12 to 15 months old--and after that they get fat and do not lay, and, in addition, most of them are often broody when they should be laying.

Therefore, in placing Wyandottes first on the list, it is justified by the long experience of many breeders. Next may be placed Orpingtons, Langshans, Plymouth Rocks. Where flesh production is desired to be of special quality, the Dorking and Indian Game may be recommended, but the latter are poor layers, and the former are not thrifty, except in cool districts. Other breeds yet to be proved are Rhode Island Reds, Sussex, and Surrey fowls.

SHOW TYPES.

In discussing the merits of a breed, one always finds the utility breeder--who depends on market eggs and the sale of table chickens--discounts the value of the ornamental and generally fine-looking show specimens. He says that their egg production is too low for profit, and urges various other points against them. On the other hand, show breeders declare that their types are the best, and that they are perfection as layers and table birds. It may be remarked that for show purposes one breeds for type, feather, head, &c., and that egg production has no consideration, nor can flesh production be considered. The aims of the utility breeder and those of the exhibition breeder do not coincide. Thus we find some show strains of Wyandottes, Orpingtons, &c., are of no value on the farm. Again, many breeders, in their endeavor to make Wyandottes or Orpingtons lay as many eggs as Leghorns, produce what can only be termed mongrels. In New Zealand for some time strong efforts have been made to bring the exhibition or show breeders and the utility breeders into line. So far the progress has been satisfactory. As regards this State, it probably will not matter, because it is very evident the utility men are not interested in shows as at present conducted. Like sensible beings they incline towards more profitable concerns.

SUMMARY.

To Choose Laying Stock. For egg production my advice is to select White Leghorns of a proved laying strain. There are some other important points besides mere numbers of eggs laid. It has frequently been stated in various publications that the small Leghorns should be chosen, as it is averred they are the best layers. It frequently happens that these degenerate specimens, mere runts, do lay well, but the fact is more important to note that they lack constitution, and cannot found a strain of heavy layers. They are in every

sense degenerates, and their descendants are prone to every poultry vice. The other extreme is the huge, square-bodied, coarse-headed type, not long ago the admiration of the show breeder. What is required is a good-bodied bird of the middleweight type—long-backed, slightly fantailed. Broad at the shoulder, deep-bodied behind the leg line, wide when viewed from behind. Legs, hard-looking, clean, slightly bayonet-shaped and set well, and wide apart. Head, sharp, active; beak, stout and well set on—a long spindly beak is to be avoided as showing lack of constitution. Eye, bright and reddish colored—avoid the pale and especially the whitish eye. Comb, neat, fine in texture, and on no account large and beefy. Wattles, fine and medium, face brilliant red. The whole appearance of the hen should be gracefully alert to a degree; plumage like a well-cut suit and hard-looking, each feather defined. Character, busy, cackling, scratching, and ever on the move; this will lay enough eggs to satisfy you. The male bird should be built on similar lines, with due allowance for sex differences. His comb should be erect and of medium size, and although the standard says that the rear part should follow the shape of the back of the head, there is no doubt that the combs which are high behind are those of the genuine laying strain. The wattles should not be too long, but the face must be red. The beak must be stout. A most important point is that both neck and saddle hackles should be abundant, long, and flowing. In the show bird they are comparatively scanty. A hard crower, and an active and courageous bird you want, not a murderous coward, forever chasing something weaker. Such a bird is not by any means ideal; there are a fair number of them here. The legs and beaks should be yellow—a deep yellow or orange leg with red streaks is all the better.

The All-round and Heavy Breeds.—Read the standard of perfection of each and use due judgment in selecting your stock so that you do not pay too much attention to the minor points. As a rule the standard as to size says "the bigger the better." This may be all right from the show point. For the utility man the moderate-sized bird, built on more active lines, is required. Also remember that while feathers are highly valuable for pillows, too many, leading to long, soft, over-abundant plumage, spell loss in commercial poultry. You do not want to breed mammoths, because the poultry trade demands medium-sized to small, plump chickens. In breeding the all-round and heavy breeds you require to select for medium egg production—you must not sacrifice other important considerations.

COLOR TROUBLES.

If you are wise you will select blacks or whites, and avoid pencilled, laced, buff, and barred varieties, as they are difficult to breed as utility birds, and at the same time retain their markings. I should suggest White Wyandottes, White Orpingtons, White Rocks, Black Langshans, and if you want novelty

try R.I. Reds. As regards the white varieties, **while** I do not like to see them practically yellow or ivory colored, the craze for the "pure whites" the "stay whites," &c., is a whim of the time. It means that you are favoring albinism. There is no doubt this is a serious point, but space forbids further reference.

NOTES.

The egg market has been peculiar this year, and prices have jumped about, and the breeder has not had his dues. In Perth and New Zealand, at time of writing, fresh eggs are worth 2s. 6d. a dozen. Curiously enough, it has been almost impossible to buy good eggs in Adelaide and the suburbs – the grocers tell you they cannot get them.

Table birds have been selling at all sorts of prices lately. Therefore breed so as to have them from September until March (the latter month you sell old stock and culls). During the winter the scrubbers and mongrels from neglected farms arrive and spoil the market.

The Government P.E.D. brand meat meal is excellent for promoting egg production – it supplies many important food constituents necessary for health. It is obtainable from the Produce Department.

Is your crop of green food satisfactory? Vegetable foods are cheap and most important.

Give your birds grit, viz., hard quartz, sea-shell, and charcoal. Keep it in a hopper or trough where the birds can obtain a constant supply.

Keep the nests, houses, and yards well supplied with clean straw. You will then have few dirty-shelled eggs.

Do not forget to study last article on housing. Good housing is the main essential. This point is gaining universal recognition.



Baling Straw, Roseworthy.

PARAFIELD POULTRY STATION.

EGG-LAYING COMPETITION, 1913-14.

[Started April 1st, 1913, to terminate March 31st, 1914.]

Competitor.	Eggs Laid for Month ended May 31st.	Total Eggs Laid from April 1st, 1913, to May 31st, 1913.
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SECTION I.—LIGHT BREEDS.

WHITE LEGHORNS.

Hurford, E. W., Grangeville	94	131
Hammill, H., Kogarah, New South Wales	92	123
Carter, A. A., Keswick	39	69
Robins, G. W., Hawthorn, Victoria	79	131
Dunn, L. F., Keswick	73	95
McKenzie, H., Northcote, Victoria	110	149
Cowan Bros., Burwood, New South Wales	86	119
Robbins, G. W., Hawthorn, Victoria	76	97
Pettigrove, T. A., Northcote, Victoria	106	122
Eckermann, W. P., Eudunda	37	43
Robertson, F., New Hindmarsh	42	57
Pettigrove, T. A., Northcote, Victoria	86	105
Cant, E. V., Medindie	77	97
Schäfer, N. H., Strathalbyn	63	138
Redfern Poultry Farm, Caulfield, Victoria	61	118
Chapman, G. H., Port Pirie	28	77
Lewis, F. M., Caulfield, Victoria	50	115
Redfern Poultry Farm, Caulfield, Victoria	80	132
Hugel, W. C., Mallala	44	63
Hocking, E. D., Kadina	43	54
Sargenfri Poultry Yards, East Payneham	55	108
Joass, W. A., Rothbury, New South Wales	71	92
Bennett & Furze, Wright Street, Adelaide	69	112
Jury, W. H., Torrensville	83	136
Olive Poultry Farm, Freeling	78	121
Kelly, Mrs. W. J. L., Quorn	41	55
Indra Poultry Farm, Freeling	91	148
Electricum Poultry Yards, Glenelg	70	128
Sargenfri Poultry Yards, East Payneham	72	128
Moritz Bros., Kalangadoo	90	139
Brown, S., Gembrook South, Victoria	86	135
Matthews, H. G., Fullerton	48	62
Harris, J. G., Black Forest	86	133
Tookington Park Poultry Farm, Grange	52	75
Bradley, J. E., Newport, Victoria	99	159
Miller, B., Parkside	20	20
McKenzie, E., Northcote, Victoria	108	181
Tookington Park Poultry Farm, Grange	81	138
Provis, W., & Son, Tumby Bay	58	85
Hillcrest Poultry Farm, Brighton, Victoria	80	147

EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended May 31st.	Total Eggs Laid from April 1st, 1913, to May 31st, 1913.
SECTION I.—LIGHT BREEDS—Continued.		
WHITE LEGHORNS—Continued.		
Beadnall Bros., Gawler	76	110
Morgan & Watson, Frankston, Victoria	117	165
Kerr, R., Longwood	61	62
Gibbs & Pine, Queentown	46	60
Hillside Poultry Yards, Hamley Bridge	67	102
Hall, A. W., South Oakleigh, Victoria	88	160
Dreyer, G. H., Wolftram Street, Broken Hill	87	98
South Yan Yean Poultry Farm, Doreen, Victoria	73	83
Pope, R. W., Heidelberg, Victoria	83	154
Tabuteau, J. O., Black Rock, Melbourne	105	144
"Koonoowarra," Enfield	80	110
Hagger, J. C., Orroroo	47	68
Bertelsmeier, C. B., Clare	61	99
South Yan Yean Poultry Farm, Doreen, Victoria	52	85
Jelliff, Mrs. T., Beverley, Adelaide	79	100
Hughes, J. J., Elsternwick, Victoria	74	111
Stewart, J. R., Thirlmere, New South Wales	59	64
Aveling, T. B., Quorn	34	34
"Nunkerowi," Neales Flat	38	41
Prior, D., Moonta Mines	22	68
Leonard, W. J., Port Pirie	29	90
Barkla, L. W., Gawler South	50	90
Foreman, E., Hindmarsh	36	78
Broderick Bros., Gawler	35	56
Tubb, E. C., Frewville	26	41
Harfield, B. L., Pinnaroo	53	86
Foreman, E., Hindmarsh	39	43
Tomlinson, W., Westbourne Park	68	135
Woodhead, H., Torrensville	58	119
Padman, A. H., Hyde Park	36	115
Franklin, G., Norwood	58	100
Mathias & Weller, Unley	23	24
Messenger, A., Port Adelaide	67	87
Purvis, W., Glanville	56	109
Albion Poultry Farm, Magill	72	149
Dunstan, L. A., Port Pirie	42	84
Trenwith, T. H., Kadina	34	78
Purvis, W., Glanville	62	122
Rice, J. E., Cottonville	58	117
Evans, H. A., Richmond	40	72
Miels, C. & H., Littlehampton	65	125
Swift, W. G., Northcote, Victoria	58	119
Bertelsmeier, C. B., Clare	61	111
Brundrett, S., Moonee Ponds	35	62
Glenelg River Poultry Farm, Mount Gambier	32	86
Padman, A. H., Hyde Park	51	84
Purvis, Miss Gracie, Glanville	35	84
Braund, J. E. & H. J., Islington	20	80
Ontario Poultry Farm, Clarendon	32	104
Brock, A. G., Hamley Bridge	20	31
Russell, E. L., Salisbury	56	76
Schwabl, J., Elsternwick, Victoria	33	88
Moritz Bros., Kalangadoo	62	140

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Eggs Laid for Month Ended May 31st.	Total Eggs Laid from April 1st, 1913, to May 31st, 1913.
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SECTION I.—LIGHT BREEDS—*Continued.*WHITE LEGHORNS—*Continued.*

Craig Bros., Hackney	47	59
Codling, H., Mitcham Park	53	108
Tidswell, H. J., Clarence Park	19	60
Bennett, E. V., Kalangadoo	67	113
Lillywhite, R. G., Malvern	33	63
Harris, A. W., Mallala	48	71
Hagger, W. H., Malvern	59	132
Winter, W. C., (Nalpa), Strathalbyn	48	58
Whitegate Poultry Farm, Deepdene, Victoria	25	60

BROWN LEGHORN.

Toe, C. E., Brighton, Victoria	7	7
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BLACK MINORCA.

Whitrow, A. J., Knoxville	13	13
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SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Neville, A. B., Fullarton	32	45
Thornton, W. J., Kew, Victoria	35	39
Kenway, D., West Pennant Hills, New South Wales	53	156
Martin, B. P., Unley Park	39	42
Cowan Bros., Burwood, New South Wales	46	89
Toockington Park Poultry Farm, Grange	23	46
Pearson, W. N., Kingswood	24	62
Hall, A. W., South Oakleigh, Victoria	33	71
Padman, J. E., Plympton	19	91
Greaves, W. E., Prospect	13	37
Bertelsmeier, C. B., Clare	26	36
Coto, T. W., Myrtle Bank, Victoria	44	110
Convent of the Good Shepherd, Oakleigh, Victoria	37	49
Craig Bros., Hackney	27	63

BUFF ORPINGTONS.

Hocart, F. W., Clarence Park	44	65
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SILVER WYANDOTTES.

Dunn, L. F., Keswick	56	113
Western, F. C., Marion	34	34
Toockington Park Poultry Farm, Grange	62	84
Kappler Bros., Marion	37	52

WHITE WYANDOTTES.

Bradley, J. E., Newport, Victoria	51	80
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BLACK LANGSHANS.

Stevens, E. F., Littlehampton	39	77
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FAVEROLLES.

Williams, W. H., Frewville	—	—
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DORKINGS.

Catheart, J. F., Newburg, Scotland	7	47
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EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended May 31st.	Total Eggs Laid from April 1st, 1913, to May 31st, 1913.
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SECTION III.—PRODUCERS.

Limited to Entries from Farmers, Pastoralists, Fruit and Vegetable Growers.

WHITE LEGHORNS.

Broster, G., Mallala	47	116
Carling, R., Kangaroo Flat	58	137
Rowe, J., Long Plain	64	108
Broster, G., Mallala	60	134
Gilbert, F. W., Kangaroo Flat	69	86
Campbell, J. D., Barabba	61	88
Forest Leigh Poultry Farm, Jamestown	19	31
Kerr, R., Longwood	60	86
Carling, R., Mrs., Kangaroo Flat	64	132
Rowe, J., Long Plains	58	76
Gill, R., Marrabel	41	56
Wurst, G. H., Marrabel	23	26
Sherrah, E., Long Plain	45	77
Rowe, N., Long Plain	31	67
Shepherd, R. H., Balaklava	51	70
Lacey, F. C., Kybybolite	66	130
Bertelsmeier, O. O., Booborowie	39	88
Dunn, H. J., Black Springs	48	66
Drake, C., Naracoorte	45	60
Rackham, C. Naracoorte	35	104
Holmes, F. A., Naracoorte	55	107
Hutchison, W. J. S., Naracoorte	19	19
"Herdfield," Mount Gambier	46	129
Smith, R. L., Hynam	26	31
Gill, Mrs. J., Kapunda	30	30
Sampson, C., Koorunga, Burra	67	105

BLACK ORPINGTONS.

Dunn, H. J., Black Springs	—	—
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BLACK LANGSHANS.

"X.L.C.R.," Littlehampton	54	85
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D. F. LAURIE, Poultry Expert.

PARAFIELD EGG-LAYING COMPETITION.

MONTHLY REPORT.

WEATHER.

The days have, as a rule, been windy, and the sky overcast; nights and mornings cold. Two light frosts are noted. Light showers of rain fell on several days, barely sufficient to start the crops of green feed.

LAYING.

The scores are showing a daily increase, which is highly satisfactory when it is remembered that a large percentage went into the usual moult soon after the test started; this moult has been a feature of competitions during recent years. Had the birds been running at large in open yards, as in previous tests, there is no doubt whatever that the majority would have gone into a complete moult, and practically "crumpled up" for some weeks. In the half-clothed condition of many birds the protection of the large, well-ventilated houses has saved the situation, and the moulting has not had any serious effects. The birds show marked improvement on each inspection, and before long laying should be general. The birds are becoming very tame. Two pens, which were mere chickens on arrival, have not yet laid, but they are making up rapidly. The condition of the birds is generally good, but there have been several wasters. These were noted in many cases on arrival, and show lack of judgment on the part of the breeders sending them. The presence of wasters as a rule is due to breeding from inferior stock, in some cases from bad housing and in others feeding. This is a point which breeders should note, as no good yields can be expected from pens in which there is a waster. No less than five wasters had to be replaced during the month. This number shows that our breeders have much to learn. There were no deaths.

BROODINESS.

During the month one Silver Wyandotte and one Black Orpington were transferred temporarily to the broody pens.

FEEDING.

The birds are fed on the same system as that adopted in previous tests. Lucerne of excellent quality is delivered three or four times a week, and is chaffed and fed to them daily in the proportion hitherto found suitable. Grit (charcoal, sea-shell, and hard quartzite) is always available, and it is very noteworthy that the birds have consumed very large quantities, and the grit tins are replenished every other day.

SCRATCHING MATERIAL.

The houses have concrete floors over which is placed sandy loam to a depth of four to six inches, over this straw of which there is a large supply. The birds have thoroughly enjoyed frequent dust baths and are free from vermin.

GENERAL.

For the first week the birds would drop their eggs anywhere but in the nests; they are now being gradually educated to lay in the proper place.

INTER-STATE BIRDS.

These are, without exception, a fine lot, of reasonable size and good type and appearance. Their laying is also good, despite the severe hardship of a long journey to a different climate. Following on the results of previous tests, our breeders will have to look to their laurels or more prizes will go across the border.

D. F. LAURIE, Poultry Expert

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, May 14th, there being present Messrs. A. M. Dawkins (Chairman), F. Coleman, C. J. Valentine, C. J. Tuckwell, J. Miller, Col. Rowell, C.B., Professor Perkins, and G. G. Nicholls (Secretary).

There was not a great deal of business for attention. The following is a summary of matters dealt with :—

Veterinary Lectures.—A request from the Whyte-Yarcowie Branch, that the veterinary lectures be printed in pamphlet form, was referred to Professor Perkins to discuss with Mr. F. E. Place, the lecturer, and report.

Wool Classer.—The Gladstone Branch asked that a wool classer might be sent into the country during shearing to assist and instruct farmers in the sheds as to the best method of classing farmers' lots. This was referred to Mr. Geo. Jeffery for report.

Afforestation.—A letter from the South Australian Branch of the Australian Forest League was received, and held over for action to be taken at the next meeting.

New Branches.—Approval was given to the formation of three new Branches of the Bureau, as follows :—Canowie Belt—Messrs. C. W. Dowden, F. A. Dempsey, J. Sparks, E. T. Daly, A. Kitschke, G. Longbottom, G. Kirk, A. Spavin, F. D. D. Stapley, A. Sanderson, J. O'Dea, J. J. O'Loughlin, T. P. O'Loughlin, R. J. Carter, G. W. Carter, W. A. Carter, H. A. Wedding, C. J. Wedding, E. W. Noll, H. E. Burton. Claypan Bore—Messrs. S. Hill, M. Robinson, D. McCormack, E. Colwill, H. Colwill, J. Northey, C. L. Dunstone, W. J. Webb, E. H. Russell, F. Burton, J. N. Entwistle, C. Hill, W. S. Gray, F. S. Tall, L. V. Shannon, A. Darke, H. W. Colwill, J. Gray. Inman Valley—Messrs. H. J. Meyer, M. J. Meyer, H. J. Jagger, G. McCoy, E. A. Scarfe, H. T. Martin, A. G. Hutchison, J. H. Lee, F. G. Barrett, V. G. Tugwell, A. E. Scarfe, J. R. Russell, J. W. Crompton, F. G. Rose, A. McCoy, J. Barrett, H. M. Parsons, J. J. Crossman, H. Gray, H. P. Smith, G. Depledge, G. Snell, V. Dennis, A. Mayfield, B. A. Moulden.

New Members.—The following gentlemen were accepted as members of the Branches shown, viz.—Orroroo—J. McNaughton, J. J. Lang, J. J. Dennis ; Naracoorte—J. B. Nolan, A. Pallant, B. O. Hennig ; Booleroo Centre—R. W. Stanton, F. W. Miller, H. Burley, C. Schmitz, A. Schmitz, R. O. Nottle, E. L. Fry, N. Jeffrey ; Yadarrie—P. G. Fitzgerald, F. G. Fitzgerald, J. Sims ; Longwood—E. Colbey ; Hartley—D. F. Westwood, J. L. Forbes ; Blackwood—G. W. Summers ; Salisbury—W. Day ; Paskeville—T. E. Eylward ; Two Wells—J. J. Hanrahan, R. H. Hayward ; Forest Range—C. Dollman ;

Yongala Vale—E. Tudor; Borrika—F. J. Weber, jun., P. J. Marker, W. Willoughby; Minlaton—A. D. Sutherland; Monteith—C. A. Bentley; Waikerie—F. B. Williams; Beetaloo Valley—J. Joyce, J. L. Murphy; Moonta—C. J. Chapman; Booleroo Centre—H. W. Kahl, J. J. Repper, J. H. Repper, W. Leschen, W. A. Reichstein, W. H. Sanders, R. Barrie, N. L. Brooks, O. B. Reichstein; Two Wells—A. T. Rowe; Crystal Brook—H. Sutcliffe; Spalding—J. J. Gale, P. E. Kelly, H. Heithersay, W. McQ. Summer-ville, J. Marrow; Julia—W. Polden; Meadows—W. Edmonds; Port Germein—J. Stewart; Pinnaroo—T. B. Shiels, R. Smith, G. Jacob; Quorn—A. Jago; Utera Plains—H. Wainnes; Coorabie—T. Gurney, H. Gurney, G. Cabot, jun., A. Broadfoot; Berri—E. Day, T. L. Hughes, G. S. Guernsey; Whyte-Yarcowie—D. L. Van Senden; Colton—J. H. McCracken, R. McCracken.

Life Members.—Messrs. J. G. Preiss, a member of the Mannum Branch since its inception 25 years ago, and J. H. Rogers, who joined the Burra Branch at about the same time, were unanimously elected life members upon a special resolution of the Board. Mr. J. McColl, of Quorn, was also approved as a life member upon the recommendation of that Branch.

Branch Closed. It was reported by the Secretary that the Kingston Branch had been closed owing to the difficulty of maintaining interest in that scattered district.



Fruit Exhibit, Adelaide Show.

ROTHAMSTED EXPERIMENTAL STATION.

1912 ANNUAL REPORT.

In view of the lengthy period during which experiments have been conducted at the Rothamsted Experimental Station, and the importance of the investigations carried out there, the following, taken from the annual report by the Director (E. J. Russell, D.Sc.) for 1912, should prove of interest : -

"The season of 1912 was characterised by its cold, wet, sunless summer, which stood out in sharp contrast with the hot, dry summer of 1911. Throughout it was unfavorable to crop growth, and the yields on the permanent plots, where but little opportunity arises for cleaning operations, were low in comparison with those on adjacent fields under ordinary cultivation. The winter ploughing was got through satisfactorily in spite of the unsuitable weather ; the dry autumn of 1911 had left the land too hard to break up, and when the rain came in December there was no less than 6in. —over 3½in. above the average. January, February, and March also were wet. April was a remarkable month ; it was the driest and almost the sunniest April of which records exist at Rothamsted. May also was dry and warm ; but the summer months were wet : in August rain fell on 27 days, amounting during the month to 6.5in.—nearly 4in. above the average. Only once before have we had so wet an August, and that was in 1879. The sunless character of the summer may be gauged by the fact that the total number of hours of sunshine for the three months—July, August, and September — was only 351, while the average for the previous 19 years was 585. Not till October did drier, warmer weather set in.

"The variety of wheat grown this year was Little Joss. It did not stand the winter very well on our poor land. Very fair crops were obtained on the rotation plots in Little Hoos field. Here mangolds had been grown in 1911, and the land was left in clean condition. The plots which have received no manure since 1904 gave over 20bush. per acre, while those that received dung this year gave over 34bush. ; the weight in many cases exceeded 61lbs. per bushel. On Harpenden field, which is in ordinary cultivation, a good yield was also obtained after a summer fallow ; but the crop on Broadbalk field, where wheat has been grown continuously since 1843, was practically a failure. Four of the plots gave less than 3bush. per acre, most of them gave less than 8bush., while even on the dunged plot the yield was below 17bush. per acre, and the weight per bushel did not usually much exceed 58lbs. The seed was sown early in October, and the young plant came up well and looked distinctly promising. Before long, however, the Black Bent grass (*Alopecurus*

agrestis), one of the most pernicious and troublesome weeds on this field, began to appear, and made such good growth during the wet, mild winter that the wheat was soon hidden. By the time the ground was dry enough to allow of hoeing it was covered with a uniform green carpet, in which the rows of wheat could only with difficulty be distinguished. Hoeing was continued through April and May, and in June recourse was had to hand weeding. None of these measures, however, proved successful; the weeds flourished and the crop did not; and our efforts were discontinued when it became evident that they were doing more harm than good.

"The success of the wheat on Little Hoos and Harpenden fields shows that the failure on Broadbalk is not directly attributable to the season, bad though this had been. The weeds were no doubt closely connected with the failure, and some observations were begun, and are being continued, to discover their effect on the crop. It is not a sufficient explanation to say that the weeds took water and food from the soil; in point of fact the Broadbalk soil during the growing season was moister and richer in nitrate than the soil of the other fields. *Alopecurus* is one of the worst of the weeds; it seems first to have caused trouble on the dunged plot, where it was noticed among other weeds in 1869, and was very rampant in the wet seasons 1878 and 1879. In 1886 and succeeding years it was so bad that extensive hand weeding became necessary, and many of the wheat plants had their roots loosened during the process; by this time it had become bad on plot 11 also (receiving ammonium salts and superphosphate). The extreme course of fallowing the land was adopted in 1904 and 1905, one-half of the field only being sown in each year, but still the grass survived. Since then wider drills have been adopted (12in.) to facilitate hoeing and hand weeding, but again without success; and now narrower drills are being tried.

"A hypothesis has been put forward that the wheat plant excretes a substance toxic to itself which is gradually accumulating in the Broadbalk soil. Laboratory experiments have so far failed to support this view. In any case *Alopecurus* seems to excrete nothing toxic to itself.

"The continuous barley plots on Hoos field were completely fallowed this year in the hope of clearing the land of weeds.

"The mangolds (Sutton's Yellow Globe) were drilled in Barnfield on May 6th. As usual, of late years the plants on the dunged strips started well and continued well; they were, however, somewhat attacked by a leaf spot. The fate of those on the strips receiving no organic manure varied with the state of the ground; where a fine seed bed had been obtained (as on strip 5, receiving superphosphate only) germination was rapid, but the young plant was killed by the drought in May, and reseeded became necessary. On the other hand, where the ground was rough (as on strip 4, receiving complete mineral manure) germination was delayed till the drought was ended, and then the plants made satisfactory growth. One of the most

interesting features of the plots receiving no organic manures is the way in which the operation of manures upon the texture of the soil becomes magnified.

"The seventeenth four-course rotation was begun on Agdell field with a crop of swedes, the variety being Sutton's Magnum Bonum. Seed was drilled on May 24th, and germination was greatly favored by the rain early in June, so that a good plant was obtained, which grew well right through the season. The completely manured plots gave a yield of $26\frac{1}{2}$ tons per acre. The plot receiving superphosphate and potassium salts only, but no nitrogen compounds, and on which no clover is grown, gave $7\frac{1}{2}$ tons of roots and $\frac{1}{2}$ ton of leaves; but the plant showed all the signs of nitrogen starvation. Last year this plot gave an extraordinarily high yield of wheat: almost 32bush. of grain and 29cwts. of straw. The source from which the necessary nitrogen is obtained is not wholly evident. The continuously unmanured plot gave the usual diminutive roots, 8cwts. per acre only being obtained where no clover is grown, and 2·3cwts. where clover had been taken two years before. It was early discovered at Rothamsted that turnips without manure fail to develop, the roots becoming no larger than radishes. The cause of this remarkable collapse is not clear. This same plot that fails altogether to produce turnips gave us last year a fair crop of wheat, 23·9bush. of grain and 20·4cwts. of straw per acre; and two years earlier it had given 11·4bush. of barley and 10·1cwts. of straw. The phosphoric acid in the soil is now reduced very considerably, and this is no doubt an important factor in depressing the yield. Mangolds on continuously unmanured land do not fail in this complete manner; indeed the only other crop on our farm that behaves like swedes is clover. The phenomenon is not connected with the fact that crops of turnips have previously been growing on the same land, because in 1908 a crop of turnips was taken in Barnfield on the mangold plots (mangolds having failed) where no turnips had been grown since 1870, and the unmanured plot gave identical results with the unmanured plot on Agdell. Equally remarkable is the curious effect of clover taken two years previously in depressing the yield on the unmanured and on the completely manured plots, the drop being from 8cwts. to 2·3cwts. in the former case, and from 587cwts. to 463cwts. in the latter.

"There is evidence that the exhaustion of lime from the completely manured plot, which is accelerated by the use of ammoniacal manures, is beginning to affect the plant, and this year we noted a considerable amount of finger and toe.

"The yield of grass was poor. The dry weather in April kept the plant back, and no satisfactory growth began till too late. Cutting took place on June 19th and 20th, and the hay was harvested in good condition. A heavy second cut was obtained on September 10th and 11th. There were more weeds than usual, especially on plot 8, which receives phosphates.

sodium and magnesium salts, but no potassium salts or nitrogenous manures, Here the weeds formed two-thirds of the herbage while the leguminosæ formed only 5 per cent. Addition of potassium salts to the manure (plot 7) doubled the crop, but halved the proportion of weeds, so that the gain was almost wholly in the clovers and grasses. Addition of nearly $2\frac{1}{2}$ cwt. (275 lbs.) nitrate of soda to this complete manure did not increase the crop; the explanation is to be found in the fact that the clovers are adversely affected, so that the natural nitrogen gathering power of the herbage is diminished, while weeds come in and take their place. Thus the quality of the herbage actually suffers. One of the most important practical lessons brought out by the Rothamsted grass experiments is that the manuring of grass land is a matter that requires very intelligent and careful consideration. The added manure favors some of the species at the expense of the rest. A new type of herbage may even set up, which may be very different from the old. Of course, on temporary grass land and leys of short duration the case is different; here nitrogenous and other artificial manures exert their full effect, and no complication arises through change of flora or suppression of the clovers.

"The trials with the new nitrogenous fertilisers were continued and are giving a steady accumulation of valuable information with regard to their effects on the different crops. This year nitrate of lime, nitrate of soda, and nitrate of ammonia were used on mangolds in Little Knotwood field, and all gave crops equal to that obtained from nitrate of soda; but this result does not necessarily prove that all the manures are equally effective. The yield was only $18\frac{1}{2}$ tons per acre, and was clearly being kept down by some factor outside the nitrogen supply. It has already been stated that the season was not a good one for mangolds at Rothamsted.

"In the laboratory and pot culture house a considerable amount of work is being carried out on the production of plant food in the soil. As the supply of nitrogenous food frequently constitutes the limiting factor in crop production our work is largely restricted to the nitrogen cycle in the soil; the other factors are, however, always taken into account, and come in for a number of subsidiary investigations. It has been shown that the production of ammonia and nitrate (two very important nitrogenous foods) is largely the work of bacteria. In normal soils, however, the bacteria are not working at their full efficiency. A factor has been discovered limiting the numbers of bacteria, and therefore of the amount of decomposition they effect. All the available evidence goes to show that this factor is biological: it is capable of growth, is put out of action by heat or antiseptics, and can only be set up again by infection from outside: it does not, however, appear to consist of bacteria, and is provisionally identified with the protozoa, of which numbers have been found in all the soils examined. Partially sterilised soils from which the factor has been eliminated are found to contain larger numbers

of bacteria than untreated soils, and to accumulate ammonia and nitrates at a greater rate : they are, as might be expected, more productive. Methods are being worked out for applying this kind of soil treatment on the large scale, but instead of setting up a large number of field plots to discover some cheap and convenient process the simpler alternative is adopted of inducing horticulturists who go in for intensive culture to adopt some of the methods known to work.

"The tomato and cucumber growers have responded well to this invitation, and during the past three seasons a number of experiments have been carried out in our laboratory and pot culture house to solve some of the problems arising out of the application of partial sterilisation to their particular work. The arrangement has been advantageous in many ways. Certain very interesting lines of investigation have been opened up that promise to throw much light on our general fertility problems, and that we should probably not have found otherwise. The growers also have expressed their interest in the very practical way of organising an experiment station to be started in the Lea Valley district, and devoted exclusively to the investigation of problems connected with the glass house industry. Finally, the method of partial sterilisation has now passed out of the laboratory into the hands of the practical man, and each season becomes cheaper and applicable to a wider range of growers ; we are also learning what are the difficulties attendant on the use of the method in practice.

"Our new conception is that the soil organisms may be divided roughly into two groups in their relation to the processes of food production— a useful and a detrimental group. The latter are, speaking generally, more readily killed than the former. Conditions that are harmful to active life in the soil tend therefore to reduce their numbers and lead to an increased activity of the useful bacteria. On the other hand, conditions favorable to active life tend to keep up the detrimental organisms, and therefore to reduce the useful bacterial activity. We have thus been able to render intelligible a number of obscure and paradoxical effects that have hitherto caused considerable perplexity. It has already been observed by practical men in various countries that certain soil conditions harmful to the growth of organisms were ultimately beneficial to productiveness : such are long continued and severe frost, long drought (especially if associated with hot weather), sufficient heat, treatment with appropriate dressings of lime, gas lime, carbon disulphide, etc. Further, it has been observed that conditions which are undoubtedly favorable to life, such as the combination of warmth, moisture, and organic manures found in glass houses, lead to reduced productiveness after a time. We are investigating a number of such problems from this new point of view.

"The survey of the soil fauna is in the hands of Mr. Goodey, who has already picked out and identified a number of the ciliates commonly present,

and is now turning his attention to the more difficult problems presented by the amœbæ and flagellates.

"The decomposition processes in the soil lead to a reduction of the stock of the soil nitrogen. Part of the ammonia and nitrates is taken up by the plant—this represents a profitable use. Part, however, is lost, and for some long time past investigations have been in hand to measure and, if possible, reduce these losses. Drain gauge or lysimeter experiments, continued over a period of 25 years by Dr. Miller, and still going on, have shown that about 50lbs. per acre of nitrogen compounds, chiefly nitrates, were washed out each year in the drainage water during the earlier part of the period, and about 35lbs. later on. The lysimeters are kept without crop or manure; they are uncultivated except in so far as is necessary to remove weeds. When last the percentage of nitrogen in the soil was determined, the loss of nitrogen was found to be equal, within the error of experiment, to the amount of nitrogen recovered in the drainage water. Under these conditions, therefore, the essential change in nitrogen compounds is confined to ammonia production and nitrification; but on the cropped plots, where large quantities of manure are added, other losses appear to go on, which are now under investigation.

"Fortunately there are gains from natural sources. Analyses made on a systematic plan by Dr. Miller have shown the low amount of nitrogen compounds in rain collected at out-lying lighthouses, and the uniform and somewhat higher amount contained in rain collected in country districts. In the rain of towns a still larger quantity is present. About 4lbs. of nitrogen per acre is thus brought down each year to the soil. The chief gain, however, appears to be brought about by bacteria. When land at Rothamsted is left in grass or allowed to cover itself with wild vegetation its percentage of nitrogen rapidly increases. How much is due to symbiotic fixation in the nodules of leguminous plants and how much to the free living *Azotobacter* is not easy to decide; but Dr. Hutchinson has shown that *Azotobacter* can fix considerable quantities of nitrogen under the conditions actually obtaining. The percentage of nitrogen present in a mixture of sand and crop residues increased when cultures of *Azotobacter* and cellulose-decomposing organisms were added, but not otherwise. Growing plants were able to utilise the nitrogen thus fixed. Again, when sugar was added to some of the nitrogen-starved barley plots an increased crop was obtained similar to that which a dressing of nitrogenous manure would have given. This result, however, only followed when the sugar was added in the warm autumn weather; in cold spring the sugar had a deleterious effect.

"Dr. Winifred E. Brenchley has continued her plant work on the same lines as before. The amount of growth a plant makes in a given soil is known to depend on the amount of food supplied, and this relationship forms the basis of the connection between the plant nutrition work and the soil work;

but a hypothesis is current, and is backed by sufficient circumstantial evidence to make it worthy of consideration, that inorganic plant poisons act as stimulants to growth if supplied in sufficiently small quantities. If this hypothesis were well-founded it would introduce a wholly new set of factors into plant nutrition relationships, and would, in addition, form a basis for important practical developments. Water cultures have, therefore, been made to test this hypothesis as completely as possible. The compounds tested have been copper sulphate, manganese sulphate, zinc sulphate, sodium arsenite, arsenious acid, and boric acid, and a wide range of concentrations has been adopted. Numerous plants have been tried, but on the whole barley and peas have proved most satisfactory. Copper sulphate was invariably toxic, even in such high dilutions as one part of salt to 10 millions of water. The effect varied, however, with the plant, and was considerably masked in presence of nutrient salts. The fact that boric acid decidedly increased the growth of peas raises the interesting question whether boron is in some way advantageous to the pea, and therefore to be regarded as a nutrient. In the case of barley no similar increase in growth has yet been obtained. Some specific effect is clearly indicated, and the hypothesis shown not to hold in its general form.

“The weed investigations have been carried into Norfolk this season. Although the work is not yet concluded certain general conclusions are already beginning to take shape. A definite association seems to exist between the weeds and the soil, the determining factor being, however, the texture of the soil rather than its geological origin, excepting only in the case of the chalk soils. The association is sometimes so close that it extends over a wide area; thus *Euphorbia exigua* and *Ranunculus arvensis* were always seen on heavy loams or clays. Sometimes, however, the association is affected by climatic or other factors; *Matricaria inodora* was common on clay in Bedfordshire, but absent near Bath. The two cases are distinguished as ‘general’ and ‘local’ association. Very few plants, however, could be said to be symptomatic of soil conditions in the sense of being restricted to any one type of soil, but a good many plants are characteristic, i.e., are more frequently found associated with one soil than with any other. *Rumex acetosella*, *Spergula arvensis*, and *Sceleranthus annuus* may be regarded as symptomatic of soils giving no carbonate reaction with dilute hydrochloric acid. A relationship also exists between the weeds and the crop: various species of *Geranium* and *Plantago lanceolata* are very common in temporary grasses (‘seeds’ crops), while *Poa annua*, *Polygonum aviculare*, and *P. convolvulus* are very rare. No doubt the conditions of cultivation account for this. It is surprising how many of the weeds belong to the *Compositæ*, at least half the genera of this order providing species of weeds. On the other hand, *Rosaceæ* and *Leguminosæ* supply very few weeds.

"The important problems connected with quality of crops are now under investigation. For some time past we have been studying the herbage of grazing land and found that the conventional methods of analysis failed to distinguish between poor herbage and highly nutritious herbage that fattened sheep without artificial food. In other investigations at Rothamsted the conventional methods have equally failed, and it has become necessary to go into the problem systematically and improve our knowledge of what confers 'quality' on crops.

"This work has now been put in hand. Mr. Davis is engaged on an exhaustive study of the constituents of the commoner crops, and has begun by investigating the nature and amount of the various sugars present. The analytical difficulties are very considerable, and unsuspected sources of error have been revealed in some of the methods in use. In particular, the addition of basic lead acetate in relatively large proportions for eliminating amino-acids, tannins, &c., gives rise to difficulties in estimating cane sugar, because the sodium acetate, formed when the lead is removed by sodium carbonate, protects the sugar from inversion by weak acids. Objection can similarly be raised against other methods, but the progress that has been made up to the present fully justifies the hope that a satisfactory solution will be found of the various difficulties encountered."



Near Bridgewater.

AGRICULTURAL STATISTICS.

RESULTS FOR SEASON 1912-13.

WHEAT PRODUCTION, 21,496,216 BUSHEL; AVERAGE 10·34 BUSHEL.

The Government Statist (Mr. L. H. Sholl, C.M.G.) has issued the final results of the last harvest of cereal, hay, and fodder crops. The climatic conditions during the early months of the season were distinctly unfavorable to all phases of agriculture, but the fine rains experienced later had a most beneficial effect, the result being the satisfactory wheat harvest of 21,496,216bush. off 2,079,633 acres, or an average of 10·34bush. The peculiarities of the season made the work of forecasting the yield very difficult, and the preliminary forecast was in February last amended by a considerable addition being made to the previously anticipated return. The actual results, however, exceeded by 557,646bush. the estimate given in the revised forecast published in February.

The total yield of wheat was 1,143,496bush. above that of the previous season, and 648,824bush. below the mean for the past five seasons. The area reaped for wheat shows a decrease of 111,119 acres on the figures for the previous year, but this was due to the lateness of the season, and was more than compensated by the increase in the area cut for hay, and the increase in the barley and oat areas. The total acreage under all kinds of cereals for grain, hay, fodder, &c., was 3,001,633 acres, an increase of 94,451 acres. The cut of hay was in advance of the tonnage of any previous year, and the yield of barley also established a record.

Below will be found further details taken from the report -

WEATHER CONDITIONS.

As will be observed from the following details of rainfall for the six months—April to September—only 12·81in. were recorded as the average over the agricultural areas, being 2·13in. below the average for 52 years.

AVERAGE MONTHLY RAINFALL OVER AGRICULTURAL AREAS.

Period.	April.	May.	June.	July.	Aug.	Sept.	Total Six Months.	Oct.	Nov.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
1908.....	·82	3·20	3·63	1·51	2·35	3·66	15·26	2·72	·40
1909.....	2·68	3·59	3·25	3·61	4·79	1·74	19·66	1·92	1·60
1910.....	·36	4·06	3·19	4·56	2·18	3·39	17·74	2·30	1·73
1911.....	·52	2·84	3·01	2·35	1·34	2·49	12·55	·92	·22
1912.....	·95	·57	2·80	2·83	2·28	3·38	12·81	1·16	1·98
Mean for 52 years..	1·73	2·60	3·05	2·85	2·57	2·14	14·94	1·79	1·08

ACREAGE UNDER CULTIVATION.

(Figures in parentheses are those for the previous season.)

The total acreage under all kinds of cereals for grain, hay, fodder, &c., was 3,001,633 (2,907,182) acres, an increase of 94,451 acres. The acreage under wheat shows a decrease of 27,646 acres, due entirely to the lateness of the season; but the substantial increase in the barley and oat areas of 28,253 acres and 91,739 acres respectively far more than makes good the decrease.

The following table shows the distribution of the area in comparison with the previous season. In former publications the acreage now shown for country outside the counties was included in the Western and Upper North Divisions.

Division of State.	Total Area under Cereal Cultivation.	Total Area Sown for all purposes with---			
		Wheat.	Barley.	Oats.	All other Cereals.
	Acres.	Acres.	Acres.	Acres.	Acres.
I. Central	984,392 (962,724)	797,726 (823,242)	45,049 (26,774)	125,601 (95,623)	16,016 (17,085)
II. Lower North	773,514 (734,302)	704,032 (684,549)	4,697 (2,257)	55,727 (40,913)	9,058 (6,583)
III. Upper North	294,380 (323,603)	290,106 (318,777)	284 (327)	2,286 (2,691)	1,704 (1,808)
IV. South-Eastern	410,495 (378,055)	307,924 (312,140)	17,896 (12,133)	78,430 (48,069)	6,245 (5,704)
V. Western	537,679 (507,278)	478,802 (467,419)	3,913 (2,065)	54,340 (37,395)	624 (399)
Outside of counties	1,173 (1,220)	970 (1,070)	30 (60)	136 (90)	37 (—)
Total 1912-13	3,001,633	2,579,560	71,869	316,520	33,684
Total 1911-12	2,907,182	2,607,206	43,616	224,781	31,579
Increase or Decrease	+94,451	- 27,646	+28,253	+91,739	+2,105

FALLOW.

Total acreage 1,537,789 (1,344,666), increase 193,123 acres.

In every division a substantial increase is shown in the area fallowed. The total area in comparison with the previous year is distributed in the several Divisions of the State as follows:—Central, 542,379 (460,315), increase 82,064; Lower North, 560,270 (534,043), increase, 26,227; Upper North, 213,107 (200,640), increase 12,467; South-Eastern, 82,941 (48,272), increase 34,669; Western, 139,092 (101,396), increase 37,696.

PRODUCTION.

In the following summary of the various crops a comparison is made of the total yields and averages with those of the previous season:—

Kind of Crop.	Seasons.				Increase or Decrease.	
	1911-12.		1912-13.			
	Bush.	Avgc.	Bush.	Avgc.	Bush.	Avgc.
CEREALS—						
Wheat	20,352,720	9.29	21,496,216	10.34	+1,139,896	+1.05
Barley (all kinds) .	702,855	17.25	1,318,734	19.12	+615,879	+1.87
“ Malting	484,951	17.06	1,032,532	19.57	+547,581	+2.51
“ Cape	208,012	18.31	273,490	18.09	+65,478	-0.22
“ Other	9,892	10.27	12,712	11.83	+2,820	+1.56
Oats	1,349,480	12.51	1,673,508	10.76	+324,028	+1.75
Rye	6,864	7.31	10,134	9.87	+3,270	+2.56
Peas and Beans....	156,522	13.24	127,553	13.70	-28,969	+0.46
HAY—	Tons.		Tons.		Tons.	
All kinds	605,239	1.16	714,766	1.10	+109,527	-0.06
Wheaten	475,782	1.18	556,444	1.13	+80,662	-0.05
Oaten	120,629	1.07	149,033	1.01	+28,404	-0.06
STRAW—						
All kinds	15,955	—	24,987	—	+9,032	—
Wheaten	10,416	—	10,900	—	+484	—

The production of wheat, barley, oats, and hay in the several divisions of the State was as follows:—

Divisions.	Wheat.	Barley (all kinds).	Oats.	Hay (all kinds).
	Bush.	Bush.	Bush.	Tons.
I. Central	6,161,030 (6,435,695)	763,041 (459,687)	637,004 (641,137)	355,964 (300,768)
II. Lower North	7,836,007 (7,227,398)	65,922 (37,988)	260,797 (269,988)	191,332 (157,729)
III. Upper North	2,035,124 (1,924,762)	3,895 (1,895)	27,056 (37,043)	44,009 (40,778)
IV. South-Eastern	2,618,292 (1,433,139)	444,867 (180,483)	480,802 (207,967)	81,458 (53,959)
V. Western	2,841,263 (3,324,076)	40,809 (21,902)	267,149 (192,935)	41,884 (51,970)
Outside of counties	4,500 (7,650)	200 (900)	700 (410)	119 (35)
Total 1912-13	21,496,216	1,318,734	1,673,508	714,766
Total 1911-12	20,352,720	702,855	1,349,480	605,239
Increase	1,143,496	615,879	324,028	109,527

Hay.—The cut of hay far exceeds the tonnage of any previous year, the total of 714,766 tons showing an increase of 109,527 tons over the previous record year 1911-12. Wheaten hay yielded 556,444 tons from 492,980 acres, which exceeds the record tonnage of the season 1903-4 by 76,721 tons.

Barley.—The yield of 1,318,734bush. of barley, with the splendid average of 19.12bush. per acre, gives an increase of 492,994bush., or 59.70 per cent. over the previous best yield of 825,740bush. in the season 1908-9. The averages per acre in the several divisions were—Central, 17.50; Lower North, 15.47; Upper North, 14.22; South-Eastern, 25.94; Western, 11.18.

Oats.—Though the average per acre (10.76bush.) was low, the total yield of 1,673,508bush. gives an increase of 324,028bush. over the previous season, the South-Eastern Division yield of 480,802bush. averaging 13.88bush. per acre.

Straw.—The increase of 9,032 tons in the quantity of straw gathered was due to the increased area reaped for barley and oats. Of the total tonnage of 24,987, wheaten yielded 10,900 tons, increase 484; barley 4,050 tons, increase 2,797; oats 9,939 tons, increase 5,873 tons.

Green Fodder and Fed Off.—39,806 (33,673) acres were either cut for green fodder or fed off, an increase of 6,133 acres. The following are the crops:—Wheat, 6,790 acres; barley, 1,153 acres; oats, 13,012 acres; and lucerne, 13,767 acres. The latter crop shows an increase of 3,176 acres.

The cut of green feed is reported to have been 45,798 tons, an increase of 11,032 tons. The principle crop was lucerne, which yielded 36,175 tons.

Wheat.—The crops made an excellent recovery owing to the favorable rains falling in November, and the actual yield of 21,496,216bush., averaging 10.34bush. per acre, exceeds the revised forecast issued on the 11th February by 557,646bush.

The 4,500bush. of wheat shown as produced in country outside the counties was grown to the east of county Herbert and in the islands adjacent to county Flinders. In publishing the results for the previous season 7,650bush. thus grown was included in the counties mentioned, but has this year been shown separately for comparative purposes.

The following tables show particulars of wheat culture in each division of the State for the season 1912-13, contrasted with the mean of the last five seasons.

ACERAGE UNDER WHEAT FOR GRAIN ONLY.

Season.	Total for State.	DIVISIONS OF STATE.				
		I. Central.	II. Lower North.	III. Upper North.	IV. South-Eastern.	V. Western.
1912-13	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Mean last five seasons	2,079,633	561,694	560,286	241,778	275,343	439,632
	1,992,874	588,728	551,917	265,740	224,362	361,947
TOTAL WHEAT PRODUCTION.						
1912-13	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
Mean last five seasons	21,496,216	6,161,030	7,836,007	2,035,124	2,618,292	2,841,263
	22,145,040	6,945,242	7,750,330	2,521,606	2,016,700	2,910,262
AVERAGE YIELD PER ACRE.						
1912-13	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
Mean last five seasons	10.34	10.97	13.99	8.42	9.51	6.46
	11.18	11.82	14.05	9.49	9.39	8.18

In view of the exceptionally low average rainfall of 14.39in. over the agricultural area of the State for the year 1911 the production of cereals and hay for the season under review is most satisfactory. It should be specially noted that the wheat crop has averaged 22,145,040bush., or 11.18bush. per acre for each of the last five seasons, the Lower North Division alone having averaged each season in the same period 7,750,330bush., or 14.05bush. per acre.

VALUE OF WHEAT CULTIVATION.

To show the importance of the wheat harvest to the State it may be mentioned that the production of grain for each of the last five years has averaged 22,145,040bush., and, inclusive of the wheaten hay crop, the mean annual value for the five seasons was £5,570,719, the value of the 1912-13 wheaten grain and hay crop on the average prices to date being £5,547,542.

As intimately associated with wheat culture the fact should be remembered that the capital invested in machinery and implements owned by agriculturists was in 1911 assessed at £2,609,098, and, further, that the progress of the farming industry is directly reflected in the flourishing condition of many of the secondary industries of the State, notably the agricultural implement and machine works, which for 1911 numbered 63, all employing four or more hands, the total hands being 1,616, who received in wages £157,149, and turned out work to the value of approximately £400,499,

WHEAT FOR GRAIN.

Division and County.	Area.		Produce.		Average Yield per Acre.	
	1911-12.	1912-13.	1911-12.	1912-13.	1911-12.	1912-13.
I. CENTRAL—	Acres.	Acres.	Bush.	Bush.	Bush.	Bush.
Adelaide	10,899	7,597	133,967	117,526	12-29	15-47
Albert	75,115	73,702	378,324	496,805	5-04	6-74
Alfred	54,536	63,563	400,998	525,043	7-52	8-26
Carnarvon	1,695	704	9,882	5,561	5-83	7-90
Eyre	61,848	55,559	437,912	445,052	7-80	8-01
Fergusson	143,639	122,193	1,794,806	1,692,177	12-50	13-85
Gawler	115,921	90,250	1,406,131	1,020,678	12-13	11-31
Hindmarsh	17,347	10,522	154,250	113,201	8-89	10-76
Light	91,401	84,317	1,308,568	1,298,924	14-32	15-41
Sturt	63,523	53,287	401,857	446,063	6-33	8-37
Total	635,924	561,694	6,435,695	6,161,030	10-12	10-97
Increase	—	—	—	—	—	0-85
Decrease	—	74,230	—	274,665	—	—
II. LOWER NORTH						
Burra	26,542	25,050	308,272	401,493	11-61	16-03
Daly	212,894	204,155	2,422,691	2,721,343	11-38	13-33
Hamley	200	200	600	700	3-00	3-50
Kimberley	15,038	15,352	96,910	131,308	6-44	8-55
Stanley	180,785	183,477	2,505,816	2,565,653	13-86	13-98
Victoria	137,915	125,670	1,867,618	1,980,212	13-54	15-76
Young	6,045	6,382	25,491	35,298	4-22	5-53
Total	579,419	560,286	7,227,398	7,836,007	12-47	13-99
Increase	—	—	—	608,609	—	1-52
Decrease	—	19,133	—	—	—	—
III. Upper North						
Blachford	9,214	7,244	20,434	19,670	2-22	2-72
Dalhousie	80,697	72,927	706,374	800,137	8-75	10-97
Derby	—	—	—	—	—	—
Frome	112,043	100,360	905,319	940,420	8-08	9-37
Granville	14,188	11,025	36,411	29,137	2-57	2-64
Hanson	23,196	20,892	67,850	37,931	2-93	1-82
Herbert	9,603	8,902	91,313	93,798	9-51	10-54
Lytton	—	—	—	—	—	—
Newcastle	22,588	20,413	96,881	114,031	4-29	5-50
Taunton	115	15	180	—	1-57	—
Total	271,644	241,778	1,924,762	2,035,124	7-09	8-42
Increase	—	—	—	110,362	—	1-33
Decrease	—	29,866	—	—	—	—

WHEAT FOR GRAIN—continued.

Division and County.	Area.		Produce.		Average Yield per Acre.	
	1911-12.	1912-13.	1911-12.	1912-13.	1911-12.	1912-13.
	Acrea.	Acrea.	Bush.	Bush.	Bush.	Bush.
IV. STH.-EASTERN						
Buceleuch	51,650	55,755	175,400	365,780	3-40	6-56
Buckingham...	30,223	31,824	207,988	407,235	6-88	12-80
Cardwell	4,535	5,166	14,922	34,727	3-29	6-72
Chandos	151,200	142,456	753,538	1,429,684	4-98	10-04
Grey	3,190	2,056	40,373	32,315	12-66	15-72
MacDonnell ...	5,870	5,118	48,637	75,660	8-29	14-78
Robe	7,344	5,462	69,706	80,907	9-49	14-81
Russell	26,849	27,506	122,575	191,984	4-57	6-98
Total	280,861	275,343	1,433,139	2,618,292	5-10	9-51
Increase	—	—	—	1,185,153	—	4-41
Decrease	—	5,518	—	—	—	—
V. WESTERN—						
Buxton	86	110	246	1,002	2-86	9-11
Dufferin	11,173	11,724	76,923	69,276	6-88	5-91
Flinders	78,874	63,405	606,407	517,327	7-69	8-16
Hopetoun	12,957	14,644	125,391	101,562	9-68	6-93
Jervois	125,166	135,039	946,442	782,139	7-56	5-79
Kintore	23,082	27,743	178,500	128,755	7-73	4-64
Le Hunte	420	520	4,600	4,780	10-95	9-19
Manchester	130	360	900	960	6-92	2-67
Musgrave	24,915	25,442	219,541	214,913	8-81	8-45
Robinson	60,858	64,861	567,537	491,752	9-33	7-58
Way	83,787	94,944	593,689	524,926	7-09	5-53
York	416	840	3,900	3,871	9-38	4-60
Total	421,864	439,632	3,324,076	2,841,263	7-88	6-46
Increase	—	17,768	—	—	—	—
Decrease	—	—	—	482,813	—	1-42
SUMMARY.						
I. CENTRAL....	635,924	561,694	6,435,695	6,161,030	10-12	10-97
II. LOWER NORTH	579,419	560,286	7,227,398	7,836,007	12-47	13-99
III. UPPER NORTH	271,644	241,778	1,924,762	2,035,124	7-09	8-42
IV. STH.-EASTERN	280,861	275,343	1,433,139	2,618,292	5-10	9-51
V. WESTERN ..	421,864	439,632	3,324,076	2,841,263	7-88	6-46
OUTSIDE OF COUNTIES	1,070	900	7,650	4,500	7-15	5-00
GRAND TOTAL	2,190,782	2,079,633	20,352,720	21,496,216	9-29	10-34
Increase	—	—	—	1,143,496	—	1-05
Decrease	—	111,149	—	—	—	—

WHEAT FOR HAY.

Division and County.	Area.	Produce.		Average Yield per Acre.		Rainfall. (Approximate Mean.)	
	1912-13.	1911-12.	1912-13.	1911-12.	1912-13.	1911.	1912.
	Acres.	Tons.	Tons.	Tons.	Tons.	In.	In.
I. CENTRAL—							
Adelaide	44,034	65,282	73,714	1.53	1.67	22.79	25.16
Albert	12,649	5,086	8,425	.56	.67	10.60	9.98
Alfred	12,600	6,297	8,575	.81	.68	12.69	10.27
Carnarvon	187	306	197	.89	1.05	22.84	20.07
Eyre	15,016	8,845	13,139	.88	.88	11.17	12.40
Fergusson	15,466	14,993	17,393	1.22	1.12	17.09	14.89
Gawler	56,009	51,688	68,122	1.42	1.22	13.45	13.79
Hindmarsh	7,395	10,030	8,999	1.20	1.22	22.18	19.13
Light	53,897	69,109	78,215	1.51	1.45	15.73	18.84
Sturt	16,773	11,623	13,962	.83	.83	13.08	13.46
Total	234,026	243,259	290,741	1.31	1.24	16.16	15.80
Increase ..	48,476	—	47,482	—	—	—	—
Decrease ..	—	—	—	—	.07	—	.36
II. LOWER NORTH—							
Burra	6,752	6,037	7,244	1.07	1.07	11.77	12.53
Daly	33,354	28,921	36,535	1.16	1.10	13.99	13.57
Hamley	887	342	611	.52	.69	11.98	9.86
Kimberley	2,533	1,458	1,752	.60	.69	10.70	13.04
Stanley	43,820	46,230	53,566	1.45	1.22	16.93	16.12
Victoria	53,603	52,037	69,797	1.35	1.30	15.34	15.84
Young	714	233	719	.62	1.01	10.98	9.63
Total	141,663	135,258	170,224	1.29	1.20	13.10	12.94
Increase ..	37,114	—	34,966	—	—	—	—
Decrease ..	—	—	—	—	.09	—	.16
III. UPPER NORTH—							
Blachford	680	96	285	.24	.42	8.31	10.42
Dalhousie	18,551	18,970	19,683	1.07	1.06	10.35	12.75
Dorby	—	—	—	—	—	8.32	9.86
Frome	23,423	17,977	19,416	.95	.83	11.68	14.53
Granville	351	343	189	.40	.54	9.78	11.05
Hanson	446	211	158	.37	.35	10.29	11.17
Herbert	991	1,039	965	1.08	.97	10.18	11.25
Lytton	—	20	—	1.00	—	8.78	10.65
Newcastle	3,076	1,583	2,473	.46	.80	8.19	11.05
Taunton	—	30	—	.60	—	10.11	9.25
Total	47,518	40,269	43,169	.94	.91	9.60	11.29
Increase ..	4,596	—	2,900	—	—	—	1.69
Decrease ..	—	—	—	—	.3	—	—

WHEAT FOR HAY—continued.

Division and County.	Area.	Produce.		Average Yield per Acre.		Rainfall. (Approximate Mean.)	
		1912-13.	1911-12.	1912-13.	1911-12.	1912-13.	1911.	1912.
	Acres.	Tons.	Tons.	Tons.	Tons.	In.	In.
IV. SOUTH-EASTERN							
Buccleuch	5,055	1,649	3,194	·55	·63	13·53	13·38
Buckingham.....	2,982	2,353	2,487	·85	·83	15·96	16·12
Cardwell	686	86	363	·46	·53	16·92	16·02
Chandos	16,535	8,791	14,070	·73	·85	14·08	14·17
Grey	1,477	1,863	2,692	1·29	1·82	28·71	27·30
MacDonnell	548	1,127	610	·96	1·11	31·08	25·64
Robe	577	1,567	668	1·06	1·16	22·89	23·74
Russell	3,880	1,931	2,309	·63	·60	11·27	11·66
Total	31,740	19,367	26,393	·77	·83	19·31	18·50
Increase ..	6,594	—	7,026	—	·06	—	—
Decrease ..	—	—	—	—	—	—	·81
V. WESTERN—							
Buxton	552	127	359	·60	·65	—	—
Dufferin	1,113	697	716	·89	·64	13·35	11·91
Flinders	6,038	8,852	5,234	1·02	·87	19·24	20·36
Hopetoun	1,359	884	710	·86	·52	11·92	10·56
Jervois	11,472	13,370	8,309	·86	·72	12·86	13·41
Kintore	1,152	1,358	594	·67	·52	11·68	11·49
Lo Hunte	200	132	85	·73	·43	13·00	15·03
Manchester	59	16	28	·25	·47	6·74	9·33
Musgrave	4,120	3,899	3,115	·89	·76	17·34	18·44
Robinson	6,231	4,382	4,152	·90	·67	15·36	13·32
Way	5,657	3,796	2,507	·67	·44	11·37	12·62
York	10	79	15	1·10	1·50	11·02	11·10
Total	37,963	37,592	25,824	·87	·68	13·08	13·42
Increase ..	—	—	—	—	—	—	·34
Decrease ..	5,483	—	11,768	—	·19	—	—
SUMMARY.							
I. CENTRAL.....	234,026	243,259	290,741	1·31	1·24	16·16	15·80
II. LOWER NORTH.	141,663	135,258	170,224	1·29	1·20	13·10	12·94
III. UPPER NORTH.	47,518	40,269	43,169	·94	·91	9·60	11·29
IV. SOUTH-EASTERN	31,740	19,367	26,393	·77	·83	19·31	18·50
V. WESTERN	37,963	37,592	25,824	·87	·68	13·08	13·42
OUTSIDE OF COUNTIES	70	37	93	1·06	1·33	—	—
GRAND TOTAL .	492,980	475,782	556,444	1·18	1·13	14·25	14·39
Increase ..	91,332	—	80,662	—	—	—	·14
Decrease ..	—	—	—	—	·05	—	—

THE WHEAT MARKET.

Under date London, May 2nd, *Beerbohm's Evening Corn Trade List* states—"According to some authorities in France that country has already bought sufficient wheat to satisfy her requirements up to the time when new wheat will be available, provided that normal climatic conditions are experienced up to harvest time. The generally fine and warm weather of the past week has materially improved the crop outlook, and it is thought that should the markets show any signs of weakening, farmers will come out with larger supplies of native wheat, and take advantage of the very high prices now ruling on the provincial markets.

Shipments last week, although appreciably smaller than in the three previous weeks, were more than equal to the estimated requirements, but promise to be much smaller this week. Imports into the United Kingdom and at Continental ports were large, resulting in a moderate increase in United Kingdom stocks, but a decrease in the quantity afloat. The afloat figures are still very large, especially the proportion destined for the Continent. Nearly all the wheat now on the way is due before the end of the season—July 31st next—and with moderate shipments in the next two months ample supplies will be available for the remainder of the present season. The Argentine in the first four months of this year has exported no less than 9,567,000 quarters, and there is every probability that the total shipments for the 12 months will be between 15,000,000 and 16,000,000 quarters, but the surplus remaining for export will, no doubt, be shipped on more moderate lines than in the past two months. Estimating this week's world's shipments at 1,300,000 quarters, the total for Europe in the nine months from August to April have amounted to 55,300,000 quarters, or at the rate of a little over 1,400,000 quarters per week. Last year's exports, when the requirements were very much smaller than this season, amounted to 43,200,000 quarters.

The North American visible supply decreased very sharply last week as a result of the reopening of lake navigation, and the "visible" will continue to decrease rapidly for several weeks. This movement has commenced one week earlier than last year, and in all probability exports from Montreal will also commence a week earlier than in 1912, when the first really large export, viz., 600,000 quarters, was in the week ended May 23rd. With the United States, as apart from Canada, expected to ship more freely than last year, some very big exports may be expected from North America from the middle of this month onwards.

The weather during the past week has generally been favorable, and the crop outlook in practically all European countries is fully up to the normal. In South Russia prospects are reported to be exceptionally promising. In America spring wheat sowings are proceeding under generally favorable conditions, whilst present indications are for a yield of winter wheat larger than in any previous year. With ordinary climatic conditions this month and next the winter wheat crop would give a yield of over 525,000,000 bush. against 399,000,000 bush. last year. The average deterioration, between May 1st and harvest time, for the last seven years was about five points; in 1905, however, there was a loss of 9.8, whilst in 1903 the deterioration amounted to no less than 16.8. In both years the principal cause given for the great deterioration was too much rain in the month of May. If the present promise should be realised, exports from the United States in August and September will probably be larger than for some years past, especially if spring wheat promises anything like an average yield."

Date.	LONDON (Previous Day).		ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
	Per Bushel.				
May 1	Quiet	..	3/8 to 3/8 $\frac{1}{2}$	3/9	3/9
2	—	..	Do.	Do.	Do.
3	Dull, and offered lower	..	Do.	Do.	Do.
4	—	..	Do.	3/8 $\frac{1}{2}$	Do.
5	—	..	Do.	Do.	Do.
6	Quiet; Liverpool steady, but quiet	..	Do.	Do.	Do.
7	—	..	3/7 $\frac{1}{2}$ to 3/8 $\frac{1}{2}$	Do.	Do.
8	Steady but quiet; Liverpool offered lower	..	Do.	Do.	3/8 $\frac{1}{2}$ to 3/8 $\frac{3}{4}$
9	Quiet	..	3/7 to 3/8 $\frac{1}{2}$	Do.	Do.
10	Do.	..	Do.	Do.	Do.
11	—	..	Do.	Do.	Do.
12	—	..	3/7 to 3/8	3/8 $\frac{1}{2}$	3/8 $\frac{1}{2}$
13	—	..	Do.	Do.	Do.
14	Quiet	..	Do.	Do.	3/8
15	Very dull; lower to sell; Liverpool very dull	..	3/7 $\frac{1}{2}$ to 3/7 $\frac{3}{4}$	Do.	Do.
16	Steady, but quiet; Liverpool easier tendency	..	3/7 to 3/7 $\frac{1}{2}$	Do.	Do.
17	Do.	..	Do.	Do.	Do.
18	—	..	Do.	Do.	Do.
19	Very weak; 6d. to 9d. lower	..	Do.	Do.	Do.
20	—	..	Do.	Do.	Do.
21	Steady, no quotation; Liverpool steadier, not active	..	Do.	Do.	Do.
22	Steady, no quotation	..	Do.	3/8 to 3/8 $\frac{1}{2}$	Do.
23	Firm, rather dearer; Liverpool firm, but quiet	..	Do.	3/8 $\frac{1}{2}$	Do.
24	Quiet	..	Do.	Do.	Do.
25	—	..	Do.	Do.	Do.
26	Steady, but quiet; Liverpool steadily held, not active	..	Do.	Do.	3/8 to 3/8 $\frac{1}{2}$
27	—	..	Do.	Do.	Do.
28	Quiet; Liverpool steady, but quiet	..	Do.	3/8 to 3/8 $\frac{1}{2}$	Do.
29	Dull; Liverpool steady, but no demand	..	Do.	Do.	Do.
30	Dull	..	Do.	Do.	Do.
31	Quiet	..	Do.	Do.	Do.
June 1	—	..	Do.	Do.	3/7 $\frac{1}{2}$ to 3/8
2	Steady, but quiet	..	Do.	Do.	Do.
3	Dull, with easier tendency	..	Do.	Do.	3/7 $\frac{1}{2}$
4	—	..	Do.	Do.	Do.
5	Quiet	..	Do.	Do.	Do.

STEAMER FREIGHTS.—(June 1st).—Steamers from South Australia to United Kingdom-Continent, full cargo rates, 31s. 3d. to 32s. 6d. per ton (10d. to 10 $\frac{1}{2}$ d. per bushel); to South Africa, 28s. 9d. per ton (9 $\frac{1}{2}$ d. per bushel). Parcels, Port Adelaide to London-Liverpool 30s. per ton (9 $\frac{1}{2}$ d. per bushel); to Continent, 31s. 3d. per ton (10d. per bushel); Port Adelaide to Melbourne, 8s. per ton (2 $\frac{1}{2}$ d. per bushel); to Sydney, 10s. 6d. per ton (3 $\frac{1}{2}$ d. per bushel).

SALES FREIGHTS.—From South Australia to United Kingdom-Continent, 31s. 3d. per ton (10d. per bushel); to South Africa, 27s. 6d. per ton (8 $\frac{1}{2}$ d. per bushel).

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on June 2nd—

BUTTER.—The month of May maintained the increase in quantities as compared with the corresponding period of last year, though at the latter end the cold snap of weather materially lessened production. Best factory and creamery butter, fresh in prints, sold at from 1s. 0½d. to 1s. 2½d.; choice separators and dairies, 11½d. to 1s. 0½d.; store and collectors', 9½d. to 10½d. per lb.

EGGS.—The local demand has been very active, but export throughout has been somewhat dull, so that prices have shown a slight easing during the month. Rates now are—Guaranteed new-laid hen, 1s. 5½d. per dozen; duck, 1s. 6d.

CHEESE.—Very fair business was done during May, though, as usual, the cold weather somewhat interfered with consumption. However, values are unaltered at 6½d. to 7d. for large to loaf.

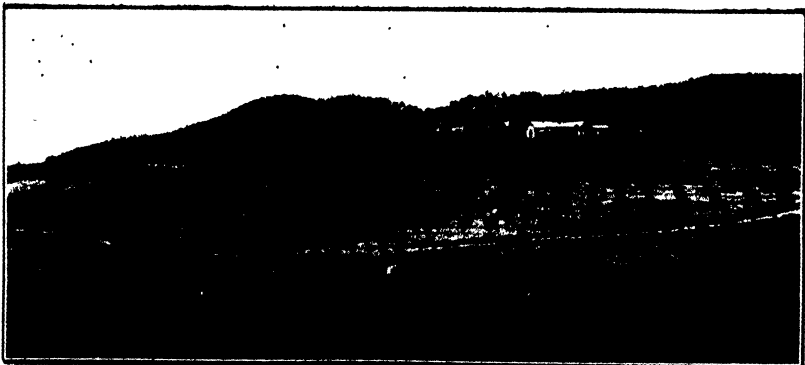
HONEY continues to find ready quittance without any quotable alteration in prices. Prime clear extracted, 2½d. to 3d. per lb.

ALMONDS.—The forwardings are still short of requirements, and market closed firm at—Brandis, 5½d. to 5¾d.; mixed soft-shells, 5d.; hard-shells, 3d.; kernels, 1s. 3d.

BACON.—Local curers have not had a very busy time, the live hog being scarce; therefore supplies have not been equal to trade wants, so that importations have been necessary to fill the shortage. Best factory cured sides, 9d. to 10d.; hams, 10d. to 11d.; farm middles and rolls, 6½d. to 8½d.; country hams, 8d. to 9½d.

LIVE POULTRY.—Supplies have kept up remarkably well during the month, but unfortunately the quality throughout has not been up to the standard. Prime sorts met with a keen demand, but light weights selling accordingly. Good table roosters brought 2s. 6d. to 3s. each; plump hens and nice conditioned cockerels, 1s. 6d. to 2s.; poor and light, 1s. to 1s. 4d.; geese, 4s. to 5s.; ducks, 2s. 3d. to 3s. 3d.; pigeons, 6½d.; turkeys, from 6½d. to 9½d. per lb. live weight for medium to good table birds.

POTATOES AND ONIONS.—Heavy supplies of potatoes have been marketed from the Mount Gambier district and Adelaide hills. Potato culture has apparently become quite a pronounced feature of industry in the country surrounding Mount Barker, and the quantity being trucked from there recently has upset the calculations of many of those engaged in the trade. Throughout the month prices have steadily declined in sympathy with the other Commonwealth markets, and there appear no immediate prospects of any improvement in this respect. Onions—There are still ample supplies of local onions, and holders of stocks are displaying some anxiety to unload. Present prices—Potatoes—Gambiers, £5 5s. per ton on rails, Adelaide or Port. Locals, 5s. to 6s. per cwt. in the market. Onions—Gambiers, £7 10s. per ton on rails, Adelaide or Port. Locals, 7s. to 8s. per cwt. in the market.



Orchard, Near Clare.

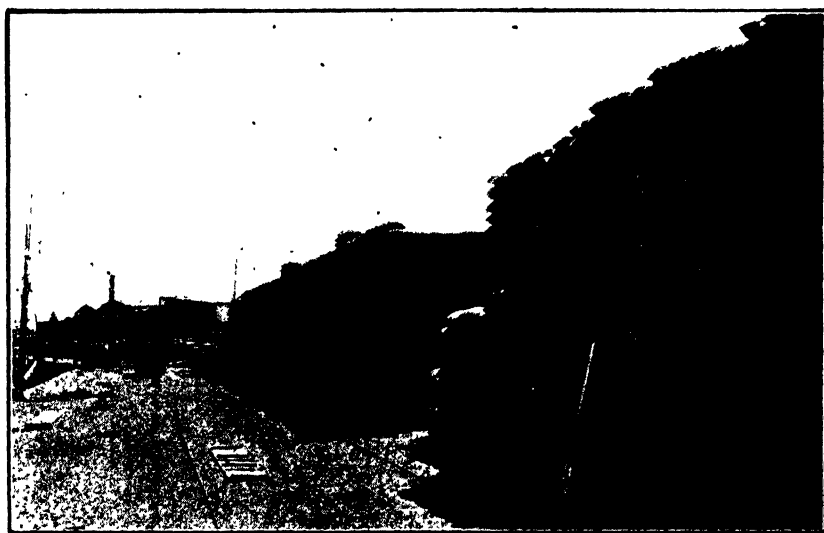
RAINFALL TABLE.

The following table shows the rainfall for May, 1913, at the undermentioned stations, also the average total rainfall for the first five months in the year, and the total for the five months of 1912 and 1913 respectively:—

Station.	For May, 1913.	Av'ge. to end May.	To end May, 1912.	To end May, 1913.	Station.	For May, 1913.	Av'ge. to end May.	To end May, 1912.	To end May, 1913.
Adelaide ...	1.09	7.12	3.80	5.81	Hamley Bridge	0.37	5.55	1.39	5.15
Hawker	0.05	3.94	2.17	2.43	Kapunda ...	0.54	6.55	1.68	7.85
Craddock	—	3.70	1.40	2.80	Freeling	0.35	5.66	1.90	9.63
Wilson	—	3.90	2.80	2.89	Stockwell ...	0.66	6.10	2.07	7.62
Gordon	0.05	6.29	1.96	2.80	Nuriootpa ..	0.77	6.42	2.11	7.10
Quorn	0.18	4.44	4.12	2.21	Angaston ...	0.87	6.37	2.54	9.91
Port Augusta	0.24	3.77	2.30	2.23	Tanunda	1.21	6.89	3.63	8.92
Port Germein	0.76	4.77	1.42	2.12	Lyndoch ...	0.60	6.44	2.91	6.87
Port Pirie ..	0.82	4.79	1.17	2.43	Mallala	0.52	5.67	1.71	4.89
Crystal Brook	0.41	5.04	2.01	1.94	Roseworthy..	0.39	5.53	2.40	5.50
Pt. Broughton	0.46	4.81	3.16	1.73	Gawler	0.95	6.44	2.38	5.43
Bute	0.91	4.90	2.10	3.90	Smithfield ..	0.49	5.20	2.09	5.54
Hammond ..	0.06	3.84	1.49	2.14	Two Wells ...	0.40	5.69	2.01	4.18
Bruce	0.13	2.81	1.90	1.96	Virginia.....	0.24	5.96	2.21	4.56
Wilmington ..	0.58	5.90	3.50	2.80	Salisbury ...	0.57	6.31	2.44	5.89
Melrose	0.57	7.57	2.96	3.01	Teatree Gully	1.23	8.82	3.86	6.35
Booleeroo Cntr.	0.12	5.02	1.50	1.93	Magill	1.16	8.47	3.87	6.59
Wirrabara...	0.48	5.94	2.01	3.00	Mitcham ...	0.94	7.53	2.40	5.78
Appila	0.16	4.99	1.39	2.13	Crafrers	1.88	13.28	6.44	10.32
Laura	0.49	5.54	1.44	2.08	Clarendon ..	1.57	10.63	4.40	7.74
Caltowie	0.39	5.42	1.68	2.78	Morphett Vale	0.85	7.70	2.55	6.24
Jamestown ...	0.40	5.30	2.58	2.94	Noarlunga ..	1.10	6.65	2.25	4.70
Gladstone ..	0.43	5.00	1.47	2.22	Willunga ...	1.48	8.28	3.59	8.08
Georgetown...	0.46	6.06	2.18	2.21	Aldinga	1.42	6.48	2.24	6.27
Narridy	0.45	5.67	1.83	1.72	Normanville	1.62	6.67	2.25	6.26
Redhill.....	0.36	5.32	2.46	3.21	Yankalilla...	1.44	7.37	3.29	8.04
Koolunga....	0.27	5.02	1.87	2.26	Eudunda	0.59	5.28	2.71	7.03
Carrieton ...	0.05	3.90	1.34	2.13	Sutherlands	0.25	—	2.19	4.02
Eurelia.....	0.08	4.30	1.94	1.76	Truro	0.82	5.84	2.68	10.04
Johnsburg ..	—	3.15	1.54	2.15	Palmer	0.82	—	1.93	7.11
Orroroo	0.12	4.77	1.84	2.57	Mt. Pleasant.	1.13	7.92	2.28	8.01
Black Rock...	0.10	4.26	1.19	2.67	Blumberg ..	1.07	8.38	3.04	3.89
Petersburg ...	0.16	4.41	2.32	4.43	Gumeracha ...	1.15	9.71	4.03	6.88
Yongala	0.16	4.38	1.47	2.33	Lobethal ...	1.13	9.67	4.04	7.04
Terowie	0.24	4.30	1.75	3.20	Woodside ...	1.18	8.53	3.76	7.57
Yarcowie ...	0.27	4.41	2.18	4.30	Hahndorf ...	1.27	9.63	3.63	8.94
Hallett	0.33	4.98	1.63	3.84	Nairne	1.21	8.51	3.35	7.42
Mount Bryan	0.38	4.43	1.87	5.03	Mt. Barker ..	1.39	9.27	3.39	8.62
Burra	0.36	5.62	1.97	3.98	Echunga ...	1.57	9.69	4.22	7.75
Snowtown...	0.70	5.11	2.45	3.40	Macclesfield..	1.54	8.53	3.56	9.93
Brinkworth ...	0.50	4.54	1.63	3.22	Meadows.....	2.14	10.44	4.31	10.03
Blyth.....	0.53	5.52	2.29	3.78	Strathalbyn..	1.04	6.16	3.57	8.01
Clare.....	1.15	7.72	3.37	5.13	Callington ..	0.99	5.27	1.57	5.99
Mintaro Cntrl.	0.28	6.37	2.18	4.29	Langh'rne's B.	0.86	4.96	1.90	4.96
Watervale...	0.91	8.54	3.42	7.29	Milang	0.72	5.68	2.24	4.23
Auburn	0.39	7.82	2.84	4.48	Walleroo ...	1.31	5.05	2.54	3.87
Manoora ...	0.33	5.71	2.39	3.92	Kadina.....	0.71	5.62	2.75	3.38
Hoyleton ...	0.44	6.28	1.31	2.97	Moonta	1.09	5.47	3.10	3.92
Balaklava ..	0.36	5.73	1.57	2.97	Green's Plns..	0.75	4.93	1.67	2.82
Pt. Wakefield	0.78	5.16	2.15	3.19	Maitland ...	1.29	6.56	2.72	5.11
Saddleworth..	0.66	6.75	2.19	5.28	Ardrossan ..	0.98	4.62	2.56	4.18
Marrabel ...	0.42	6.14	1.57	4.98	Pt. Victoria..	1.00	5.25	2.91	2.73
Riverton ...	0.56	6.70	1.94	5.95	Curramulka...	1.36	5.67	2.66	4.26
Tarlee.....	0.45	5.89	2.09	5.53	Minlaton ...	1.02	5.43	2.52	3.07
Stockport ..	0.52	5.30	1.88	5.66	Stansbury....	1.22	5.40	3.33	4.79

RAINFALL TABLE—*continued.*

Station.	For May, 1913.	Average to end May.	To end May, 1912.	To end May, 1913.	Station.	For May, 1913.	Average to end May.	To end May, 1912.	To end May, 1913.
Warooka....	0.73	5.40	2.78	3.04	Bordertown...	0.53	6.03	1.54	6.27
Yorketown .	1.12	5.46	3.32	2.87	Wolseley ...	0.45	5.42	1.15	5.19
Edithburgh .	1.53	5.54	2.85	4.45	Frances ...	0.36	5.79	2.59	4.93
Fowler's Bay.	0.72	4.28	3.09	5.16	Naracoorte .	1.32	6.65	3.78	6.01
Streaky Bay.	1.29	4.79	2.35	5.09	Lucindale ..	0.69	6.65	4.41	4.44
Port Elliston.	1.12	4.60	2.63	2.81	Penola.....	1.45	8.16	7.38	5.56
Port Lincoln.	1.35	6.15	6.42	3.73	Millicent ...	1.97	9.07	6.97	7.89
Cowell	1.22	4.47	4.09	2.49	Mt. Gambier.	1.80	10.02	8.36	8.21
Queenscliffe...	1.79	5.85	3.79	4.43	Wellington .	0.89	5.25	1.66	5.47
Port Elliot .	1.49	6.85	3.60	5.49	Murray Brdg.	1.36	4.86	1.03	8.24
Goolwa.....	1.17	6.02	3.92	5.36	Mannum ...	1.10	4.34	1.04	5.61
Meningie ...	0.67	6.14	3.01	4.95	Morgan	0.57	3.33	1.66	3.04
Kingston....	2.02	7.48	6.05	6.47	Overland. Crnr.	1.00	4.17	1.06	5.83
Robe	1.32	7.47	4.68	5.02	Renmark ...	1.07	3.60	1.21	6.02
Beachport...	1.29	8.16	5.21	7.01	Lameroo ...	1.19	—	1.56	6.69
Coonalpyn ..	0.66	5.35	2.20	5.77	Tintinara ...	0.58	—	—	—



Wheat Stacks, Port Wakefield.

ANALYSES OF FERTILISERS.

The following table gives the results of the analyses made by the Government Analyst (Mr. W. A. Hargreaves, M.A.) of further samples of fertilisers taken by the inspectors under the Fertilisers Act since the beginning of the year 1913:—

Name.	Phosphate.				Total Phosphoric Acid calculated as Tricalcic Phosphate.				Nitrogen.	Nitrogen as Nitrates.
	Water Soluble		Citrate Soluble		Acid Soluble.		Result of Analysis.			
	Result of Analysis.	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee		
Adel. Chem. & Fer. Co., Ltd.—										
S.A. super.....	34.00	30.00	—	—	—	—	—	—	—	—
Super. "B".....	14.00	16.00	24.12	14.00	3.12	8.00	—	—	—	—
Hay manure	29.38	30.00	6.31	2.00	10.06	3.00	—	0.50	—	—
Gollin and Co.—										
Nitrate of lime ex <i>Flauen</i>	—	—	—	—	—	—	—	—	13.02	13.00
Government Produce Depot—										
Bone dust	—	—	—	—	—	40.00	52.10	3.96	4.50	—
Bone manure	—	—	—	—	—	23.50	29.69	5.99	5.75	—
Blood manure.....	—	—	—	—	—	—	—	12.24	12.50	—
Hackett, E. & W. (Agents)—										
Nitrate of lime ex <i>Asiratic</i> ...	—	—	—	—	—	—	—	—	13.00	13.00
S.A. Gas Co. sulphate of ammonia	—	—	—	—	—	—	—	—	—	—
Adel. Chem. Co.'s lawn manure..	17.71	7.00	5.21	7.00	2.45	8.00	20.79	4.80	6.00	—
Int. Fert. Co.'s International A B.	23.03	19.00	—	—	—	—	—	3.12	3.00	—
Mt. Lyell Mining & Rly. Co., Ltd.—										
Standard super.	36.11	36.00	—	—	—	—	—	—	—	—
Guano super.	33.64	27.00	3.56	3.00	4.13	6.00	—	—	—	—
Adelaide super.	35.47	30.00	—	—	—	—	—	—	—	—
S.A. Farmers' Co-op. Union, Ltd.										
(Agents)—										
Wallaroo Phos. Co.'s stan. super.	37.45	36.00	—	—	—	—	—	—	—	—
" " " bone super.	31.07	25.00	7.78	5.00	4.98	10.00	—	1.48	1.00	—

GEO. QUINN, Inspector of Fertilisers.

AGRICULTURAL BUREAU REPORTS.

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* No report received during the month of May.

+ Formal report only received.

† Inadvertently omitted.



NOTE RE ANNUAL MEETINGS.

As many Branches will now be holding their annual meetings, the reports of same will be treated as formal unless some other business is also dealt with: When, however, matters of agricultural interest are discussed and the record is printed, a resume of the annual report will also be included if space permits.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

July 9th and August 13th.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

Amyton, May 19.

(Average annual rainfall, 11·82in.)

PRESENT.—MESSRS. T. O'Donoghue (chair), T. Griffen, R. Brown, J. J. Cormack, T. Ward, D. P. Aitken, A. J. Phillis, M. Corcoran, A. Crisp (Hon. Sec.), and one visitor.

IMPROVING BUREAU MEETINGS.—The following paper was read by Mr. J. J. Cormack:—
“ I regret to notice that during the past year the attendance at our Bureau meetings has not been what it should be; hence I write this paper, with a view to improving our Branch. I consider the different Bureau meetings held throughout the State are to the producer what the State school is to the children—a place at which to learn. A large number of subjects come under discussion in each Branch yearly, subjects of the greatest importance locally, concerning the welfare of the producers engaged in the cultivation of the soil, &c. The papers on the whole are carefully prepared by men of practical experience, and with a full knowledge of the details contained therein, and with the discussion which follows the reading of each paper printed in the *Journal of Agriculture*, which I find has a very wide circulation, even amongst non-members of Bureaus, they must prove of immense benefit to the State generally. Every encouragement should be given producers who are non-members to attend meetings. Members could here do the Branch a service by inviting their friends. If they did not care to make use of the question-box erected here for the convenience of non-members they could ask questions on any matter of interest to them at the meetings, when the information sought would be supplied if possible. Questions would also create interesting discussion, which would be to the advantage of members generally. A person who joins the Bureau should do so with the full intention of endeavoring to improve the Branch of which he becomes a member. His desire should be as far as possible, by writing a paper at least twice yearly on any subjects with which he is conversant or by introducing subjects for discussion, to become an active and useful member of the Bureau. He would then very much lighten the duties of the Hon. Secretary, who is very often at his wits end to ascertain where he can procure a subject for his forthcoming meeting. I am sure you will all agree with me that this is not a state of affairs that should exist in any Branch. It is the duty of every member to be present at every meeting of the Branch which he has joined, and on no account absent himself without grave cause, as a dilatory member in this respect cannot be of much advantage to the Branch. He misses many very important subjects and discussions, even arising from the general correspondence of the Branch, when his advice and vote might be very desirable. Should a member be unavoidably absent from any meeting of which he is notified by the Hon. Secretary, as a matter of courtesy he should forward to the Hon. Chairman an apology for non-attendance. This apology could be read with the general correspondence. Such action, as well as being courteous, would show to his fellow members that he was really interested in the welfare of the Branch. Be punctual. Unpunctuality in this respect is a great drawback to the success of the meetings. It often happens that members come into the meeting quite an hour

after business has begun. This, as well as being unsatisfactory to the latecomer, tends to disturb the meeting. No member who has the interest of the Bureau at heart should be at fault in this respect. Every member should enter into and take a lively interest in all matters under discussion, and I would like to suggest that the Chairman use his discretion in calling on members to speak. He could help bashful members by requesting them to come forward and criticise the subject under discussion. Members who are backward would gain more confidence in themselves. New members should be given every encouragement, even to assisting them to prepare their first paper on the subject chosen or allotted them. Many valuable pamphlets are in circulation containing interesting information regarding agriculture, dairying, treatment of livestock, &c., as well as interesting information appearing frequently in the daily and weekly newspapers. If members cut these out and brought the clippings along to the meetings to be read they would bring about discussion which might be of benefit to members generally. Again, members should experiment on their own account, even in a small way, with different varieties of wheat, lucerne, oats, and give the value of their experience in whichever branch of agriculture they are engaged. They could then learn from each other's experience. There should be no such thing as an uninteresting Bureau meeting, as there is such a wide range of subjects of interest which does not obtain in any other association. If a dull meeting occurs members have only themselves to blame. It at once denotes a want of interest and activity on their own part. I would suggest that a social be held annually, with the object of inducing new members to join. I would also suggest as one of the main factors to make our Branch of the Bureau an active one that homestead meetings be held during the spring time. Although farms may not have much to interest in the way of intense culture locally, nevertheless there is much practical knowledge to be gained by a visit to different homesteads which, together with the social intercourse, would tend to considerably strengthen the Branch. At the Congress held in Adelaide during September of last year one of the officers of the Advisory Board stated that he was under the impression that some of the country Branches of the Bureau were suffering from sleeping sickness. My main object in bringing forward the suggestions contained in this paper is to endeavor to stimulate each and every member of this Branch to greater activity, so that when the next Congress comes round our delegates will have the pleasure of reporting that there is not the slightest symptom of that dreadful disease in any of our members."

Arden Vale and Wyacca, April 21.

(Average annual rainfall, 16·65in.)

PRESENT.—**MESSRS.** J. H. Williss (chair), E. Klingberg, O. Eckert, J. Absalom, P. A. Hannemann, L. Schuttoffel, O. E. Hannemann (Hon. Sec.), and several visitors.

RESERVE FUNDS FOR FARMERS.—**MR.** A. Hannemann, who had had extensive farming experience in various parts of South Australia, stated that wherever practicable it was wise for the farmer to store during good seasons sufficient feed and also sufficient money to tide him over bad seasons, and thus obviate the necessity for borrowing. During good seasons frequently £100 or £200 could be put into a reserve fund, say in the Savings Bank, without being much noticed; but there was a general tendency to spend this money in expensive buildings, machinery, &c., which in many cases could be done without. While it was quite right for the farmer to look for such comforts as were secured by those in other occupations, he should also remember the maxim, "Business first and pleasure afterwards." In addition to the feeling of security which a balance in a bank gave, there was always a certain regular income and a standby for the time when old age overtook the farmer.

Arden Vale and Wyacca, May 19.

(Average annual rainfall, 16·65in.)

PRESENT.—**MESSRS.** J. H. Williss (chair), M. and O. Echert, J. Absalom, L. Schuttoffel, P. A. Hannemann, H. Liebich, J. and T. Klingberg, R. Paynter, O. E. Hannemann (Hon. Sec.), and five visitors.

FEEDING HORSES.—In a paper on this subject the Chairman advised owners of stock in this district to put by a stack of hay when it was plentiful, thatching this with straw to a depth of from 4in. to 6in. If the stack was expected to be kept for some considerable time it was unadvisable to put hay containing grain in the roof on account of the loss which might be occasioned through mice. Cocky chaff should be saved. A good daily ration for eight horses consisted of 60lbs. of hay chaff, one bag of cocky chaff, and 2½galls.

of crushed wheat in the morning; 60lbs. of hay chaff with 1gall. of crushed wheat at mid-day; and in the evening 60lbs. of hay chaff, one bag of cocky chaff, and 2galls. of crushed wheat; the whole being damped. He preferred long hay for feeding overnight. A little salt added to the ration would be an improvement if the horses were being given fresh water. In discussing the subject, Mr. Echert said grooming was very necessary to keep the animals in healthy condition.

Coomooroo, May 17.

(Average annual rainfall, 12in.)

PRESENT.—**MESSES.** E. Berriman (chair), Jer. Brown, A. H. Cook, A. Polden, R. Brice, F. Gregory, C. Phillis, E. Brice, H. Fisher, C. Phillis, C. B. Lillierapp, W. M. Robertson (Hon. Sec.), and two visitors.

WHEAT-GROWING.—Mr. R. Brice read a paper on this subject, as follows :—“ I would advise members in this district to fallow as early as possible to a depth of 3½in. to 4in. Summer fallowing where possible is preferable, as this enables farmers to clean their land better, which is very important to successful wheat-growing. Harrowing after a rain, with a good sharp set of harrows, will cause weeds to grow much freer and thicker. After fallowing in summer I advise cultivating immediately following seeding, as this will ensure another growth of weeds by spring time. Cultivate fairly deep in the spring. This will work up seeds that are buried, causing them to grow quickly at seed time. There will then be no necessity to work deep at seeding, and the soil underneath the surface will keep fairly loose during the summer months. Sow a bushel of clean seed and 40lbs. of manure to the acre on fallow. This will be found thick enough for most varieties of wheat. If sowing late I would add from 10lbs. to 15lbs. more super. With the early varieties of wheat I would add another peck of grain, as they do not stool well. If the wheat is pickled it will be found necessary to set the drill to sow a little more seed per acre, as it will not run so freely. No hard and fast rule can be laid down as to which varieties of wheat are best. It is unwise to stick entirely to one variety. Federation is the best all-round wheat. Dart's Imperial, if sown early, Yandilla King, Marshall's No. 3, Steinweidel, and Nobbie do well if sown early.” In the discussion which followed, members agreed with the writer on most of the points set forth in the paper. Mr. E. Brice would plough to a depth of at least 4½in. to 5in. The majority of members favored shallow ploughing, and would summer fallow as much as possible. Mr. Cooke believed that if the land were worked as the writer stated crops would as a rule be cleaner.

Davenport, May 15.

(Average annual rainfall, 9in. to 10in.)

PRESENT.—**MESSES.** Roberts (chair), Holdsworth, Bothwell, and Lecky (Hon. Sec.).

BRANDING AND TREATMENT OF HIDES.—The following is taken from a paper read by Mr. Bothwell :—“ A great deal has been written concerning the loss occasioned by branding cattle in Australia, and some authorities have computed this at about £300,000 yearly. There is another big loss in the skinning or flaying, this being less excusable for the reason that it is due to carelessness. Those who are directly interested in this question are the breeders of cattle on the one side, and on the other the tanners, curriers, and manufacturers of leather goods. It is a recognised fact that the breeder of cattle must have some distinguishing mark whereby he may know his own, the usual custom being a firebrand. In South Australia the first position for this is on the off rump, hip, and thigh; second, off ribs; third, near rump; fourth, near ribs; fifth, near shoulder; and sixth, off shoulder the first four positions being on the most valuable part of the hide. Assuming that a side of harness leather weighing 22lbs., which is a good average weight, is free from cuts and brands is worth 1s. 8d. per pound, the price will be £1 16s. 8d. If it has a large brand and cuts, its value will be 3d. per pound less—a total of 5s. 6d. on the side. It will be plainly seen that a brand placed on the rump or ribs, being the prime parts of the hide, causes a greater depreciation in value than if placed on the shoulder or neck, where the hide is not so valuable. If the brands are placed on the cheek there is no loss. The breeders assert that branding with a hot iron is the cheapest and most effective method; that their loss is not more than 1s. a hide on this account, and that this small sum enables them to prove ownership; and, further, that if an animal is branded on the rump it can be more easily distinguished. There are only three positions on the animal where the brand can be distinguished between April and September, viz., the upper shoulder, under

ribs, and rump, the latter being the premier position for legibility. Some time ago an Act was passed by the New South Wales Assembly, at the request of the tanners and leather merchants, prohibiting brands on certain parts; it was, however, thrown out by the Upper House by a large majority, the members holding that owners would not wilfully damage their own property by brands, except so far as to enable them to know their own stock. This they could not do if compelled to brand on the ear, neck, leg, or hoof, the hair growing to such an extent in winter as to render the brand in many instances invisible, and in nearly all cases illegible. This is quite right, as far as the breeder is concerned, but there is the economic point of view also, as between the raw hide and the finished article there are many stages, and at each stage the loss increases, and in the end assumes gigantic proportions. Other methods have been tried—acid, to cause the hair to grow a different color, as, for example, on a bay horse or red bullock the hair would grow white; but on a white horse or bullock the mark would not be so easily distinguished. Acid would destroy the skin in like manner to the hot iron. The only remedy I can suggest is to place the brand on the upper shoulder, although this part is not considered as good as on the rump. Flaying is not so noticeable, and leather that is cut may be used; but it is just as strong as the weakest part, and often, indeed, it will prove unreliable, and possibly cause accident. The effect that a brand has on leather is somewhat similar to that obtained by putting it into boiling water, which shrivels it up, rendering it hard and brittle to such a degree that it will break, when bent, like wood. Branded leather can be used where there is no strain, and where it will not be bent. The brand may not appear large when put on when the cattle are young, but there are some brands that, if not made of considerable size, are liable to blotch; so when the animal is full grown the brand will appear in 6in. letters or larger. As most brands represent three figures, the surface covered is considerable. If a beast must be branded on the hip, brand it as far behind the pin bone and as low as possible. When the hide is taken off it should be kept under cover, to protect it from the weather, which decreases the value. There is an unlimited demand for good hides. In the older countries they cannot now supply their own requirements, and it is only in Australia where there are empty spaces that one can look forward to supplying this growing demand." Mr. Holdsworth was of opinion that the breeder of stock did not trouble much about the position of a brand on a beast so long as it was easily recognised. The trouble began when it was slaughtered and the hide was turned into leather, when the damage done by branding on the most valuable part of the skin reduced its commercial value. The loss was passed on to the purchaser of boots, harness, bolting, etc.

Dawson, March 22.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. E. W. Smart (chair), C. H. Meyers, G. Ferguson, T. R. Hughes, J. Nottle (Hon. Sec.).

SEEDING OPERATIONS.—Mr. Ferguson said he would not sow unpickled seed. He preferred to use a bluestone pickle. Federation and Steinwedel usually required a solution somewhat stronger than other varieties. Mr. Meyers expressed his intention of sowing Federation wheat principally, as he had always received good returns from this variety. He also intended trying small areas of Bayah and Bunyip. He would not sow before rain, and the practice he followed was to cultivate the land, then harrow it, drill in the seed, and cross harrow. Where this was done little difficulty would be experienced with uneven ground when mowing and reaping. The Chairman made a practice of commencing seeding about the end of March, and he had always secured better returns from that portion of his crop sown before rain. He would not sow more than 40lbs. of seed to the acre, as where the seeding was thicker the wheat did not get an opportunity to stool.

Dawson, April 19.

(Average annual rainfall, 10½in.)

PRESENT.—Messrs. E. W. Smart (chair), H. Davies, S. H. Baker, W. A. Wilson, H. L. Meyers, C. Burden, C. H. Meyers, J. Nottle (Hon. Sec.), and two visitors.

CATTLE.—The Chairman considered that breeders of cattle should keep pure-bred bulls as a first essential to success. The Herefords were a good class of cattle for beef, but they were not profitable in the dairy. He strongly advocated the Shorthorn as a dual purpose cow for this district, and with this view members generally agreed.

FOREST TREES.—Members had found that sugar gums grew better on rising ground in this district than in the low-lying parts. Where the land became flooded the young trees died off more quickly. For this class of soil pepper trees were recommended, and when planting forest trees it was thought better to plough the land than to simply dig holes for the trees.

Morchard, April 19.

(Average annual rainfall, 11½ in.)

PRESENT.—Messrs. J. Scriven (chair), E. J. Kitto, W. Reichstein, W. Toop, R. Kitto, G. Parsons, H. A. Toop, H. Kupke, R. Jasper, W. A. Toop, and B. S. McCallum (Hon. Sec.).

PREPARATION FOR SEEDING.—The Hon. Secretary read the following paper:—"At this time of the year every farmer should have his seed wheat cleaned and thoroughly graded if possible. I favor pickling some of the later varieties of wheat that are to be sown first. My experience has led me to believe that it does not matter if his wheat is pickled weeks before it is sown if the farmer uses bluestone. This course saves a lot of time when the rains come, which is a great advantage, especially if the farmer is short-handed. The drills should be overhauled and put in perfect order. It is best to take them out of the shed and try them at work; but, before starting, thoroughly clean out all manure; the same thing applies to the wheat feeder. See that nothing prevents the wheat running as freely as it should, and also that all parts are coggling well together, and that the oil runs freely. The cultivator needs attention. Care must be taken to see that all the tines are set evenly so that they cut to exactly the same depth. The best way to test it is to try it over a piece of hard ground that has a level surface; any tines that are set too deep or those that are set too shallow can then be detected. If this is not done, and the cultivator is not set evenly, after working some days it will be found that it has been missing the weeds, perhaps with only one tine, but that will be sufficient to spoil the work. All the swings and chains need to be in good repair and harness overhauled. Care should be given to the horses. They should be fed up, and not left half-starved about the stable or in the paddocks, and then be expected to start at hard work straight away. A good supply of hay should be chaffed and the chaff house kept well filled, especially if the farmer has to depend on the horses for chaffing. If this is done it will enable him to go straight ahead when the land is in the best order." Members commented favorably on the ideas expressed in the paper. Mr. W. Toop preferred a solution of 1lb. of formalin in 50galls. of water for pickling.

Mount Remarkable, May 14.

(Average annual rainfall, 14·43 in.)

PRESENT.—Messrs. N. S. Giles (chair), J. McIntosh, L. A. Bauer, W. Oldland, F. B. Smith, M. G. Giles, E. M. Willington, E. B. Andrews, W. Smith, jun., J. Welsh, H. H. Davie (Hon. Sec.), and one visitor.

HOMESTEAD MEETING.—Members took the opportunity of inspecting the farm of Messrs. N. S. and M. G. Giles, "Rookwood." Among the most interesting features was a fowlhouse, in the construction of which only two pieces of wood had been used, and a drafting yard for sheep, where six selections could be made in one run by means of an arrangement of small gates. The deviation of water from a creek past the house and through pig and lucerne paddocks was an instructive object lesson.

PLANTING TREES.—It was resolved, on the motion of Mr. H. H. Davie, seconded by Mr. J. McIntosh, "That the Chairman and the Hon. Secretary wait on the Port Germein District Council and ask permission to plant trees in the street in the approach to Melrose, and ask the council to help in providing suitable guards for the trees."

Quorn, May 17.

(Average annual rainfall, 13½ in.)

PRESENT.—Messrs. R. Thompson (chair), Noll, Bury, Britza, Schulze, Brewster, Patten (Hon. Sec.).

WET v. DRY SOWING.—Mr. Brewster expressed the opinion that it was advisable to sow grain before rain if the precipitation held off too long. The crop could then be harrowed

before or after it had germinated. Mr. Noll agreed. Where the farmer waited for rain it would usually be necessary for him also to wait until the weeds grew, which would result in very late seeding in some instances. He preferred sowing in March.

Warcowie, May 19.

(Average annual rainfall, 12·16in.)

PRESENT.—Messrs. T. Donnellan (chair), Ryan, Telfer, Marrow, Bennett, Hilder, Duffy, F. Crossman, E. Jarvis, W. J. Sander, B. Crossman, J. Feineler (Hon. Sec.), and four visitors.

HORSE-BREEDING SOCIETIES.—A discussion on the subject of the proposed horse-breeding societies was initiated by Mr. W. J. Sanders. A resolution was carried—"That this Branch considers the nomination fee of £4 4s. too high, and recommend a reduction to £3 3s., and also that the number of mares to be served by one horse should be limited to 70 instead of 84." Members generally agreed that it would be better for a number of farmers to form a private society to purchase a horse for £400 or £500 for members' use. The owner of a good draught stallion would be well paid for one season's service at 25 per cent. less than the sum above mentioned, i.e., £415 16s. It was impossible for farmers to pay such a high figure and make horse-breeding and farming pay, and in order to encourage breeding the Government should reduce the cost of the proposed scheme. It would then receive the support of the farmers.

Willowie, May 13.

(Average annual rainfall, 11·90in.)

PRESENT.—Messrs. L. McCallum (chair), B. E. Schmidt, S. C. Greig, A. W. Howard, E. S. Bristow, S. and I. McCallum, S. Tucker, A. and F. Gray, F. Richter, A. Wilkins, E. J. Kentish, L. Hughes, and W. P. Foulis (Hon. Sec.).

QUESTION BOX.—A number of matters were discussed. With regard to the idea of reducing the price to be paid for samples of wheat containing a percentage of smut, Mr. McCallum thought it necessary that merchants and sellers should come to some understanding. Members were opposed to the practice of dumping good and bad samples of grain into one heap, and thought that the farmer who carefully marketed his wheat under the present system received no recompense. Mr. Gray mentioned that millers were able to remove smut from the grain, but they could not get green wheat out of the bulk, and this lowered the quality of the flour. To clean smut from wheat, Mr. Kentish advocated removing the sieves of the winnower. Mr. Gray had done this by considerably reducing the shake of the sieves, and placing a piece of flat tin thereon to carry the grain well on before it could pass through. Another piece of tin was placed slightly lower down under the sieve, and this concentrated the draught.

SALT WITH BLUESTONE FOR PICKLING.—Mr. E. J. Kentish had for several years added salt to the bluestone solution for pickling seed. He thought it counteracted the tendency of the bluestone to interfere with the germinating power of the grain. Mr. A. Gray also found that when salt was used with the bluestone the grain germinated more quickly.

DEPTH OF SOWING.—Members thought that under dry conditions it was advisable to sow as shallow as possible, many preferring to cover the seed by means of the harrows after the drill. Mr. B. E. Schmidt thought there was less danger of grain malting when it was sown shallow. The sun and wind kept the surface of the soil dry, and when rain was experienced the seed came through before a crust formed on the surface.

HORSES' SHOULDERS.—Mr. L. McCallum advised rubbing lard into the shoulders of young horses a day or two before putting them to work. A well-fitting collar was an essential. Mr. F. Gray advised washing the shoulders with water in which acacia bark had been boiled. Members agreed that the animal should be worked lightly at first.

WORKING FALLOW.—Mr. L. McCallum thought the cultivator better than the skim plough for working fallow, as it did not expose a fresh surface to the influence of evaporation. Messrs. S. Greig and E. J. Kentish favored the cultivator, whilst Messrs. E. S. Bristow and F. Gray preferred the skim plough, as it was more effective in destroying weeds.

Wilmington, May 21.

(Average annual rainfall, 18·26in.)

PRESENT.—Messrs. J. Hannagan (chair), Robertson, Scholefield, J., W., and G. Schuppan, S. and D. George, Farrell, Hill, McGhee, Zimmermann, Noll, Forbes, A. R. and E. J. Gloede, and B. Jericho (Hon. Sec.).

TREE-PRUNING.—This subject was dealt with in a paper by Mr. Benier. The objective in pruning fruit trees, he said, was to regulate the branch structure and encourage fruit-bearing. To carry out this work satisfactorily it was necessary to have a good knowledge of the purposes of the different branch structures, and also the ability to form an early judgment as to the likely productiveness of different shoots and branches. Constant practice and careful observation were the only means by which this could be obtained. The best time for the work was during the months of June and July, but frequently it might be advisable to do a little thinning out of young shoots in the autumn. It was necessary, however, where the latter practice was adopted, to guard against a further growth of the shoots, which would happen if the pruning were done too early. The shoots should be cut above the fourth bud, and they should then be cut back to the second bud when winter pruning was being carried out. The early cutting back encouraged the sap to flow to the main branches, and in no case should the latter be pruned until winter. The umbrella shape was the best for trees, as the roots were then kept shaded by the foliage. In order to secure this shape, the trees should be cut back from the first year in which they budded. Trees such as apples, pears, plums, &c., should be cut about 15in. above the previous year's pruning, care being taken to increase the main branches as the tree developed towards maturity. The centre growth should be regulated so that light and air were admitted. Apricots, peaches, nectarines, &c., generally bore fruit on one-year old wood, and, in consequence, a number of the best shoots each season should be retained at regular intervals from the bottom of the tree on each side. If the stronger shoots were cut back in winter, the growth of the smaller fruit-bearing wood would be encouraged. All soft, watery shoots should be cut out, and if in the early part of the season the trees were overloaded with fruit they should be carefully thinned out, and a better quality crop would be secured.

Wirrabara, May 17.

(Average annual rainfall, 18·9lin.)

PRESENT.—Messrs. E. J. Stevens (chair), W. Marner, H. and P. Lawson, S. Thiselton, W. Bowman, R. Curtiss, P. H. Hockridge, C. T. Borgas, A. E. Stott, R. L. Watson, H. G. Hastings, H. E. Woodlands, J. Fitzgerald, P. J. Curnow, P. R. Hoskins, W. H. Stevens, G. Hollett, F. T. Jettner, and A. R. Woodlands (Hon. Sec.).

HANDLING WHEAT IN BULK.—In a paper on this subject Mr. A. C. Fitzgerald said the present method of marketing wheat was both expensive and clumsy. If Australia was to hold its own in the wheat market it would be necessary to adopt a more up-to-date method, and a considerable saving could be made by dispensing with wheat sacks, which were a very heavy item in connection with the annual harvest. With a system of bins and elevators at each railway siding it would only be necessary for the farmer to purchase sufficient bags to hold two or three days' stripping. With the idea of first giving the system a trial before immediately adopting it, he recommended the erection of bins and elevators at one or two of the shipping centres. In discussing the subject, Mr. P. Lawson said that the saving in the bags together with the enhanced value of the yield due to grading in the elevators, would amount to at least 2d. per bushel. Mr. F. T. Jettner thought the time was not yet ripe for this alteration. The cost would be very large on account of the large number of centres from which wheat was sent. A motion favoring the adoption of the system was carried.

MANURING FRUIT TREES.—In reply to a question as to whether any definite information was available regarding the value of artificial manures on fruit trees, Mr. P. J. Curnow said he had used 5lbs. of bone super. and 1lb. of sulphate of potash per tree in his orchard with very good results.

STRIPPING AND THRESHING.—At a previous meeting this subject was dealt with in a paper by the Chairman. In his opinion the reaper-thresher would play an important part in the harvest field in the near future. The method of removing heads from the straw by means of the knife and comb obviated a good deal of trouble with choking and splitting of grain. In the harvester and damp weather stripper one of the most important features was the beater-bar. This should be fairly wide, thereby ensuring

greater suction, and should be set well back at the cutting edge, as a good deal of grain was wasted from the combs by the beaters carrying it round in the drum. In the majority of modern machines threshing bars, especially crossbars or studs, were not necessary. The diamond was fairly successful, but the threshing could safely be left to the damp weather roller. As the knife or blade was less than the thickness of a grain of wheat it would be set very closely, thus ensuring even threshing without cracking the grain, and cutting through tough heads without difficulty. The difficulty with the square spike thresher was that it resulted in a considerable amount of cracked grain, which, in the case of the harvester especially, was blown out with the chaff.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Booleroo Centre, May 9.

(Average annual rainfall, 15·83in.)

PRESENT.—Messrs. W. Michael (chair), J. Repper, W. Whibley, C. H. Jaeschke, H. E. Kirkland, J. H. Repper, M. J. Carey, B. Nottle, N. L. Brooks, W. H. Nottle, sen., D. Michael, L. F. Powell, W. A. Borrill, J. Carey, jun., J. Carey, sen., B. Giddings, M. Larkin J. Llewellyn, and O. E. W. Bruns (Hon. Sec.).

PICKLING WHEAT.—This subject was dealt with in a paper by Mr. W. H. Nottle. The method he adopted in connection with the pickling of wheat was to have a large cask sunk in the ground, and over this a gallows, to which was attached an endless chain. Close handy was a 1,000-gall. tank to obviate trouble with water-carting. He two-thirds filled the cask with water, and into this put about 12lbs. of bluestone a few days before commencing pickling. A small chain was put round a bag of wheat and this was attached to the endless chain, the wheat being lowered into the pickle and allowed to remain there for about five minutes. It was then pulled out and allowed to drain for a few moments. After 20 bags had been treated in this manner about 3lbs. of bluestone were added, in order to keep up the strength of the solution. The bags on being taken out of the barrel and drained were stood upside down, and any solution remaining therein was allowed to run back through the wheat; 1lb. of bluestone with 12galls. of water would be sufficient to do six bags. With varieties that were somewhat more susceptible to smut than others it might be advisable to slightly strengthen the solution; but care should be taken not to make it so strong as to affect the germination. Members generally considered bluestone better than any other preparation for this purpose. The majority favored the floor method of pickling, namely, sprinkling the solution of bluestone over the wheat and turning the latter with a shovel until it was properly covered.

Crystal Brook, April 25.

(Average annual rainfall, 15·62in.)

PRESENT.—Messrs. M. P. Pavy (chair), R. R. Shaw, H. Sutcliffe, M. Weston, H. S. and E. Billingham, A. E. Cooke, R. Heaslip, A. Story, V. Sargeant, G. Miell, J. Pridham, J. Duffield, J. Teakle, R. Pavy, C. J. Jenner, B. Weston, J. A. Greig, W. Hutchinson, W. W. Robinson (Hon. Sec.), and one visitor.

FEEDING PEAS TO SHEEP.—The following paper was read by the Hon. Secretary:—
“Over a very large area of South Australia it will not be possible to grow peas successfully, but there is a large portion of the State where they can be grown. It is only by experimenting that we shall be able to determine the suitability of our district for this crop. I heard quite recently of two instances in which they have been grown with excellent results in this district. The object of growing peas or summer fodder for stock is to supplement the natural pasture by raising food at a time when it is scarce. Those who follow the stock market closely are well aware of the fluctuations and variations that take place from year to year. There are times when store sheep bring almost the same price as sheep

in a primer condition, while at others, generally during February, March, and till the rain comes to germinate the natural grasses, the difference between the prices of store and fat sheep is very great. At the last sale in this town four yearling cattle were sold for £1. In a few months' time, when the now barren paddocks will be covered with a fine coat of natural grasses, these would have brought from £2 to £3 per head. What is true of cattle is also true of sheep, and is typical of the conditions prevailing in Australia to-day. Mr. Heaslip at a former meeting said, 'It will pay to breed lambs on the farm if the season opens up early, but if it does not you are better without them.' This is not as it should be. The stock-carrying capacity during the summer months is a problem that we have to face and, if possible, to overcome. Whether peas will overcome this difficulty and settle the problem, as far as this district is concerned, I am not in a position to say, but peas as a fodder for sheep are unsurpassed. Personally I can see no reason why they should not be grown successfully in this district, providing the land is well prepared. The One Tree Hill correspondent of the *Register* wrote—'One of the local farmers is a firm believer in peas—feeding off the crop in the paddock—for fattening purposes. This season he has had a crop of 50 acres, and is confident he will be successful with 30 sheep to the acre. His experience has been that the benefit to the succeeding crop more than compensates for the loss in putting in the peas. Last year he had five acres of peas, and the succeeding hay crop this year was so heavy (fully 4 tons to the acre) that a considerable portion was knocked down by the rain.' Another writer says, 'I have grown several splendid crops of grey peas. The ravages of grubs have spoiled them as grain, but they would be found excellent for grazing.' Peas are not only a splendid fodder, but they are soil renovators. They would be a profitable crop if only for their value for fattening stock, for the restoration of soil fertility, and as a weed eradicator. They should be sown in August, at the rate of 2 bush. of seed per acre, with lewt. of superphosphate. They will then be ready to feed off early in the following year. Mr. G. W. Green, of Lyndoch, is convinced that there is no more useful feed on the farm than peas. He put in 41 acres last season in three paddocks. On one containing 20 acres he drilled lewt. of bonedust, lewt. of super., and 2 bush. of peas to the acre. This paddock was on the face of a hill. The second paddock contained four acres of flat—some of his best ground. He drilled in on this 2 bush. peas and lewt. of bones. These two paddocks apparently produced about equal crops. The small paddock was harvested, and eight bags to the acre were winnowed. He turned about 400 lambs on to the larger paddock for six weeks, and as they seemed to make so little impression on the crop in the first fortnight he turned in about 40 or 50 mixed sheep also. About 200 of the best of these lambs would have brought about 9s. in the Adelaide market straight off the grass, and the other 200 were worth considerably less. Three hundred were sold in the Adelaide market, and averaged 12s. 3d., and 140 brought 12s. 8d. 'I consider,' he says, 'that the peas increased the value of those 300 quite 4s. per head, equal to £60 on the 300 head. The lambs were turned in under unfavorable conditions. After shearing they seemed to go back considerably, and the ewes fattened quickly, apparently neglecting their progeny. The very late rains in November, though beneficial to the peas, forced me to delay turning the lambs in for quite a fortnight, which no doubt caused a further check, as the feed had gone off. After they had been on the peas a week an improvement was noticeable. I am inclined to think, however, that I put rather too many lambs on the peas. If I had been content with, say, 350 head, instead of 450, and had been able to hold another fortnight later, I would have probably secured an extra 1s. 6d. to 2s. a head. I consider peas a catch crop, which allows of a crop being grown every season, instead of the land having to be left as bare fallow.' There is no doubt that they enrich the soil to a very great extent. This was proved by a strip of land sown to peas and which produced quite a ton of hay per acre more than bare fallow ground on each side of it, the plots having been worked and manured similarly. There is great diversity of opinion as to the best time to sow. Some farmers in this district favor August, or even September, but I prefer early June. The heaviest and best crops grown in the Blumberg district are planted in that month. Good results, however, are obtained when the planting is done later in the year. It is a very difficult crop to grow, as one hot wind at a certain stage will ruin it, and a bigger risk is taken than in growing any cereal crop. But every farmer should give it a fair trial in place of bare fallow.' In discussing the subject, Mr. Pavy said peas had been successfully grown by Mr. Fergusson in this district. Mr. W. W. Lovelock had sown about three acres with this crop. He harvested 10 large bags of grain to the acre, and purchased 60 ewes at 4s. 2d. per head in February and put them on to the stubble. In April he sold the lambs at 10s. 6d. per head. In a dry year like the last he did not think peas could be grown. Mr. Pavy last year sowed Yorkshire Hero peas, and they did very well. Mr. A. J. Dennis sowed four acres of peas, which did well, but they were attacked by the grubs. Seven years ago a promising crop was killed by a hot wind,

Gladstone, May 17.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. R. E. Lines (chair), J. H. Sargent, E. H. Davies, R. Peters, J. Page, F. Aughey, G. Fisher, A. Anderson, A. B. Blesing, W. Brayley, G. Black, W. L. Evans, J. Coe, R. Coe, T. Hollitt, J. Fisher, H. Fay, S. Masters, A. E. Dinning (Hon. Sec.), and five visitors.

FRUIT-GROWING.—Dealing with this subject in a paper, Mr. A. B. Blesing said the most suitable position for a garden was a piece of ground with a good subsoil, situated in a sheltered spot. The land should be ploughed and then worked again as deep as possible with the plough, but without the mould board. It should then be pegged out, apple trees being about 20ft. apart and stone fruit up to 25ft. where the situation was very suitable. The holes could be sunk and the bottom should then be loosened up. The loosened earth should be raised to a conical shape, the roots being spread around this. For a home garden assorted fruits should be planted, but where the orchard was intended for commercial purposes, varieties that carried well should be chosen. Peaches of the Briggs' Red May, Triumph, Hales' Early, Early Crawford, Elberta, Lady Palmerston, and large late red varieties should provide fruit from the end of November to the middle of April. Varieties of apricots for drying could advantageously be planted. The Japanese plum was a good saleable fruit and a good bearer; but apples were the mainstay, Jonathan, Cleopatra, Dunn Seedling, and Rome Beauty being good varieties. Pears and grapes should not be neglected. He preferred trees which had grown one year from the bud; the stem could then be worked to the height desired, 15in. being favored. A higher stem entailed more difficulty in working.

Mount Bryan, May 24.

(Average annual rainfall, 15·8in.)

PRESENT.—Messrs. Trallagan (chair), Wardle, Jefferies, Thomas, Nutt, Phillips, and H. L. Hatherly (Hon. Sec.).

CULTIVATION OF GREEN FODDER.—The following is taken from a paper read by Mr. A. A. Jefferies:—"If a man has an exceptionally good grass paddock it will pay him to experiment in small lots before turning it all over and thus destroying the natural feed. I do not think the district is a good one for early cereal crops, such as oats or barley, for feeding off, as the early rains do not seem reliable. In the South considerable quantities of barley are regularly sown for the purpose of feed, either for sheep or cattle, and many farmers fatten considerable numbers of lambs for the early market in this way and then finally reap a very fair crop at harvest time, but the rain is usually more frequent than it is here and the temperature does not fall so low, so the feed grows more rapidly. The drawback with barley is that it has to be resown each year, and it impoverishes the land much more than other crops. One of its advantages is that it is an early and rapid grower, and comes on just at a time when all natural fodders are scarce or damaged by the early winter rains. A splendid fodder for all farm stock, and one that it will pay well to experiment with, is peas. These do not seem to have been tried to any extent in the North. I think the severe frosts will have a detrimental effect on them, and will most likely reduce the yield. A farmer and grazier in the South, who had about 80 acres of peas, which he grew for the sole purpose of fattening sheep, was asked his opinion of them for that purpose, and in reply said he wished he had 500 acres instead of only 80. The same man the previous year was feeding sheep on peas out of the bag, and considered it the cheapest and best, a double handful per day being sufficient for a ewe and lamb. The sheep should not be turned on to the crop until it is dry, they will then eat peas, straw, and all. Cows will eat all day at a stack of pea straw and keep in fair condition. Pigs will fatten very quickly on them, and the meat of either pigs or sheep fed on peas is of very fine flavor. When crushed they make a splendid horse food, being very strengthening and fattening. They can be sown on land intended for fallow, and instead of impoverishing the soil they have the opposite effect. To my knowledge a paddock one year yielded over 2 tons of hay per acre, the following year 40bush. of peas, and the next year 2 tons of hay. If we can get something off our land, and at the same time improve it, we are doing better than by leaving it out as bare fallow. Lucerne is the best fodder crop, but we are not all fortunate enough to be in a locality where it will thrive. I believe Mount Bryan is favorably situated, and the quality of the soil in many places along our flats seems to be favorable for its cultivation. The soil is rich and deep, and water in many places is abundant and at a shallow depth, and is of good quality. It is generally understood that lucerne will go down many feet to water, although I believe

much better results would be obtained if the water were brought to the lucerne. I have seen some most remarkable growths obtained in this way. About two years ago I carted lucerne from a paddock where it had just been out and was then being flooded. A fortnight later the lucerne was again a foot high. This goes on all through the summer, and as soon as the cold, wet, winter weather sets in it stops growing. Cattle are then turned in on it. It requires working up each year, and a good dressing of stable manure is a splendid thing for it. Much better results are obtained by cutting and feeding it to the stock than by allowing them to run on it, as the plant does not get injured to anything like the same extent, and the ground does not get packed so hard. It is just when the lucerne is going off that a plot of barley comes in very handy, as this is just making good growth about that time, and continues so right through the cold weather. Once lucerne is established it does not require replanting for several years, and the older it is the stronger it grows. In this respect it differs from the other fodders which we have mentioned, for there is no idle land. Seed is not required each year, an item which counts very largely in a farmer's expenses. If properly managed it will yield a good return for any labor or capital expended on it. It is advisable to let it lie for a few hours before using, otherwise cattle may become blown through eating too freely of it, and the milk will have a decidedly strong smell and taste."

North Booborowie. April 10.

PRESENT.—Messrs. Ashby (chair), W. C. and F. C. Catt, Warner, Mayfield, Phillips, Hanlin, Hannaford, Mudge, Smart, Morgan, Halls, Clark, Cousins, Simpson (Hon. Sec.), and two visitors.

WOOLCLASSING.—Mr. Henshaw Jackson (Wool Instructor, School of Mines) addressed the meeting. While South Australia was noted for the get up of its large clips, he said, the small and farmers' clips were generally marketed in a very crude state. It was more profitable to class wool before sending it to market. The worsted manufacturer utilised long wools, the woollen manufacturer the short wools, and neither wanted a mixture of the two. The dealer bought up poorly classed clips cheaply at the sales, classed them, and resold at the profit which the farmer would have reaped had he classed his clip. After being skirted it was sorted into long and short wools. These classes were again sorted into light and heavy wools, as the light wools, when scoured, yielded a higher percentage of clean wool and commanded a higher price. The lecturer explained that classing was largely a matter of "matching" the fleeces, and thus making each class as even as possible. The buyer, finding the wool in a certain clip even, could then bid with confidence, knowing that the bulk of the class would be of the same quality as the small amount he was able to inspect. While very few men could breed sheep with success many could rear them. He advised farmers starting to rear sheep to buy a few good ewes and a ram from a reputable breeder, and not breed "scrubbers." For fat lambs he favored the Dorset Horn ram on the crossbred Lincoln Merino ewe. Other crosses also were good, but he urged the advisability of uniformity of breed in a district, as it enabled farmers to secure a higher price for lambs, as also for wool, if a co-operative shearing shed were erected in the district. As wool from lambs of the second cross ewe was of little use, either as a long or short wool, the lambs should be all sold for killing and not left to be shorn. He expressed the opinion that in view of the small amount of feed required for sheep (one ton of hay keeping six sheep for a year) hand feeding could, with advantage, be more generally practised.

COMPULSORY REGISTRATION OF STALLIONS.—At a previous meeting the following paper was read by Mr. A. S. Toll:—"This question was brought before the Bureau Congress last September by Mr. V. Koschade, Greenock, in a motion which reads as follows:—'That this Congress recommends the Government to make provision for the compulsory registration and examination of all stallions permitted to travel for hire or service, and that a limited number only be permitted to travel in a specified area, according to the requirements of the district.' If such a Bill were introduced into Parliament and became law there would certainly be an improvement in our horse stock, and an equally certain rise in horse values. But do we require such an Act or its results? Breeders, of course, would benefit by a compulsory registration Act; but, for the following reasons, I think such an Act entirely unnecessary. In the first place, anyone who wishes to keep or breed a good class of horses has plenty of opportunities of doing so under the conditions which prevail at present. There are numbers of first-class mares and horses to be found on many farms in South Australia, and the majority of farm horses in use at present, although not able to boast of a pedigree, are quite able to do all

that is required of them. In the second place, the South Australian farmer, generally speaking, cannot afford a high-class, high-priced horse. Owing to the high prices ruling for land, and the amount of rough work that will have to be done on the millions of acres of new land now opening up for settlement, we must breed thousands of cheap horses—horses that can be bought at three years for £20 or £30—mongrels, really, but useful, hardy, and with a capacity for work quite equal to that of a well-bred Clydesdale worth a hundred pounds. I know of men in different parts of the State who have bought land at high prices during recent years, and of others starting on newly opened Crown land, who, if they had been unable to procure the hardy, useful horses I have just mentioned at a low cost would have had small chance of success. In conclusion, therefore, I would say 'No' to such a proposal, on the ground that it would be a hindrance to agricultural expansion and development, and a disadvantage to the farming community generally." In discussing the subject, it was thought that a reliable guarantee of a stallion's soundness would compensate for the rise in the price of the fee. The superior quality of the foal would also repay the extra charge many times over. Notwithstanding the general improvement in the animals, there would always be weedy horses which could be obtained cheaply. The majority of members favored the proposal recommended by the Congress. [The amendment which was carried at the Congress was a modification of the above motion, the reference to limiting the number of stallions for a given area having been deleted.—Ed.]

Port Broughton, May 16.

(Average annual rainfall, 14in.)

PRESENT.—MESSRS. (G. Pattingale (chair), T. Pattingale, J. Barclay, D. and E. Allchurch, W. Excell, G. Rantley, B. Donnelly, R. Hill, J. H. Fletcher (Hon. Sec.).

ECHOES FROM CONFERENCE.—Mr. T. Pattingale reported on the Conference of Northern York's Peninsula Branches of the Agricultural Bureau, held at Kadina, a full report of which was printed on page 1151 of the last issue. Dealing with Mr. Brinkworth's paper on "Autumn Fallowing," he expressed the view that the practice would render the ground liable to drift, and this should be avoided. Mr. G. Pattingale did not believe in the system, as it involved the destruction of vegetable matter that would be better buried in the soil, and it would impoverish the land eventually. A better practice was to simply scratch over the surface of the land in the autumn to encourage the growth of weeds, and then to fallow in winter.

CLASSING FARMERS' CLIPS.—In dealing with the address delivered by Mr. Jackson, Mr. Pattingale said he did not think it possible to keep a sheep on 1lb. of chaff per day. Mr. Barclay thought the farmer was well advised to class his wool even if the total clip only amounted to five or ten bales. It might eventually happen that the particular grower had larger parcels to dispose of, and any attention which he had paid to his smaller clip would stand to his credit in the eyes of the buyer.

Port Pirie, May 3.

(Average annual rainfall, 13·2lin.)

PRESENT.—MESSRS. C. E. Birks (chair), T. Johns, W. Mundy, D. McEwin, H. G. Hawkins, E. Welch, W. R. Wright, T. Kirchner, E. J. Hector, F. Johns, and A. M. Lawrie (Hon. Sec.).

VISIT TO BELGIUM.—An interesting paper, descriptive of different matters which had come under his notice during a visit to Belgium, was given by Mr. E. J. Hector. He took the opportunity of inspecting various experimental farms and agricultural schools, and described at length his impressions of these institutions.

MORTALITY IN STOCK.—Mr. T. Johns mentioned that stockowners were suffering a number of losses in this district. Mr. Murray attributed the trouble to the shortage of fodder in autumn, but Mr. Hawkins pointed out that the animals that died were not always those in poor condition. Mr. Birks thought young calves were given insufficient nourishing milk. Too much separated milk ruined the constitution of the animals, and he recommended feeding them on equal proportions of whole and separated milk. In his opinion if this course were adopted less trouble would be experienced with dry bible.

Redhill, May 13.

(Average annual rainfall, 16·79in.)

PRESENT.—**Messrs.** McAvaney (chair), Stone, Cox, Coffee, J. J. and W. Hayes, Potts, Treloar, Button, Steele, Dick, Holmes, Pengilley, Campbell, F. and P. H. Wheaton, F. A. Wheaton (Hon. Sec.), and six visitors.

SEEDING OPERATIONS.—In a paper on this subject Mr. Treloar said the experience of last year showed that it was advisable to await rain before commencing seeding operations. The liability of wheat to smut made it necessary to treat the grain in some manner, and this could not be better done than by using bluestone. Before the pickled wheat was put into the bags, these should be turned inside out, as there was a danger of the smut balls which might remain therein again contaminating the seed. The land should be worked to provide about 2in. or 3in. of fine soil on the top. Under this there should be a hard sub-soil. The seed should be sown as shallow as possible. When cultivating dry ground, whilst it was necessary to go to sufficient depth to destroy the weeds, care should be taken not to raise clods to the surface. The harrows should follow the drill, to cover any unburied seed. Slightly over a bushel of seed and about 70lbs. of manure to the acre were advised as the most suitable quantities to sow. In discussing the subject, members generally preferred using bluestone for pickling. Mr. Pengilley did not, as a rule, believe in dry sowing. He thought it advisable to run the roller over the land before the drill when this course had to be followed, as the soil was made finer and the drill would do better work. It was advisable to wait a few days after rain before harrowing a dry-sown crop. Some members thought that where the soil was too fine there was a danger of it becoming waterlogged in a wet season, whilst others believed that a fine surface was generally better. Mr. Stone was of the opinion that where unpickled seed was sown it should consist of grain grown from pickled wheat. The Hon. Secretary favored the practice of harrowing after the drill; 1cwt. of super. per acre would give better results than a dressing of 70lbs. Mr. McAvaney thought the cloderusher better than the roller, as the former broke the lumps, whereas the latter in some cases pressed them into the soil. In reply, Mr. Treloar recommended working the summer fallow lightly, and then cultivating it to a fair depth. He would roll the land before the drill was put on, and harrow the crop two or three days after rain when the wheat had been sown in dry soil.

Spalding, May 16.

(Average annual rainfall, 20½in.)

PRESENT.—**Messrs.** E. E. Gill (chair), J. Marron, P. A. Gill, A. B. Jones, G. Shorn, T. J. Preiss, and D. A. Campbell (Hon. Sec.).

LUCERNE CULTIVATION.—The following paper was read by Mr. Heithersay:—"Alfalfa, or lucerne, as a forage plant is of the very first order, and has been known since the dawn of the world's recorded history. It was carried into Greece from Persia in 490 B.C., introduced into Rome 146 B.C., and it has been continuously in cultivation in Italy ever since. The name 'Alfalfa' is derived from the Arabic word meaning 'the best fodder.' It ranks as the greatest fertilising plant known to scientific agriculture. All cereal crops use large quantities of nitrogen. A paddock cropped for years in wheat will eventually contain too little of this for the production of a profitable crop. Lucerne, after the first few months of its life, obtains its whole supply from the air; in fact, more than it really needs. The land intended for this crop must possess a good drainage. It does not particularly matter as to the quality of the soil so long as it does not contain too high a percentage of clay or alkali; but a fairly deep loam of sandy rather than a clayey nature is the best. The area should be fallowed at least three months before sowing, the weeds being eradicated and the soil well worked up with a scarifier, and rolled when ready for the seed. In properly prepared land about 10lbs. to 12lbs. of good seed is sufficient to ensure a satisfactory stand. The soil should, if possible, contain a sufficiency of moisture to germinate and carry the plant into its fourth leaf, or, better still, until it is 4in. to 6in. in height. Harrow lightly or brush the seed in, and then again roll the land, with the object of excluding as much air as possible, and also securing a firm seed bed. I prefer to broadcast the seed, as the moisture dries out more readily from the drilled plots than from the broadcasted after the plant is cut, while if grazed between seasons the sheep eat off the crowns of the plants in the drills to a greater extent than where the seed has been broadcasted. In addition, they often cut out runs between the rows away from their

camps. This causes the plants to stand up considerably higher above ground than they did originally, and the mower is liable to cut them off below the crown the following season if the machine is set as low as it should be. Fall sowing, namely, in April or May, is the safest proposition, as it permits the seed to get a fair start, while the ordinary winter rains encourage a good root growth and places the plant beyond the danger of a dry October. Should the district prove subject to heavy frosts a nurse crop of barley, sown at the rate of not more than three-quarters of a bushel per acre, is often necessary. Land containing any appreciable quantity of saline matter should always be sown in the fall, so that the winter rains may hold back the alkali from the surface until early in the summer. In the meantime the plant has secured a fair start, and as it can withstand a fairly liberal percentage of salts—provided always the drainage is good and the soil kept moist—then satisfactory crops may be expected. For spring sowing the land should be ploughed early in the winter to permit the sun, rain, and frost to properly weather the soil. Sow as early in September as possible to allow the young plants to become established before the heat of the summer. No nurse crop is necessary or desirable with spring sowing. Lucerne sown in April should, in a favorable season, be ready for the first cutting in October or November. The plant is usually rather spindly in appearance, comparatively few of the crowns having even started to form. The best guide as to the proper time to cut is the bloom, which should just be showing. I intend to deal with only two ways of irrigation, namely, general flooding from an elevated flume through distributory pipes, and sprinklers. General flooding is generally adopted by growers around Adelaide, and may be considered fairly satisfactory under certain conditions. It is recommended where the soil surface is irregular or shallow as to make grading a dangerous proposition. Little or no grading is necessary under the method, although it is always more economical and satisfactory to have a properly graded field or plot. The water is supplied direct from the pump into a sheet iron (galvanized for preference) or wooden flume of a suitable capacity for a full head of water. The flume is usually supported on jarrah or red gum posts or trestles, averaging 3ft. or less in height. Water is delivered either through canvas hose or galvanized iron pipe 3in. or more in diameter, affixed temporarily to permanent outlets of various patterns. It runs to the end of the distribution medium and flows direct on to the land. As soon as the soil around the outlet is satisfactorily saturated one or more sections of the pipe are removed, or the position of the hose terminus altered, and the process repeated until the area commanded is irrigated. The outlet is then closed and the next one opened, when a similar procedure follows. As the pipe sections are removed from the first line they are fixed ready for the next. This is repeated in order until the full area of the field is supplied with water. Permanent borders, thrown up with a buckscraper or ridger, are a great assistance to the irrigator in his work of distribution under this method. Sprinklers are of little use on extended areas, although they are very suitable for garden plots and small lucerne patches which can be watered during the early morning, in the evening, or at night. In laying out this system everything depends upon the water pressure. Where it is low sprinkling will not be a success. After having ascertained the water pressure, lay supply pipes at regular intervals accordingly, either with fixed sprinklers to command the full area or stands and taps to which a hose can be affixed and an effective distributor attached. These are set up on a given area, and as soon as it is sufficiently saturated they are removed and set up again elsewhere, care being exercised to see that the outside sprays meet, and thus water the whole. The fixed system of sprinkler is not recommended, as with a falling pressure it is ineffective, added to which the expense of installation is prohibitory. Amongst other objections to sprinkling on a large area are the following:—(1) The cost of installation of the system; (2) damage done on tender plant growth by scalding when the water is applied by this process on a particularly hot, calm day; (3) loss of water and damage to the tender growth when being applied during a spell of hot winds; (4) damage to the growing crops in moving the sprinklers and hose; (5) the danger of watered circuits not meeting and portion of the crop being left unwatered. Lucerne can be most effectively and economically watered at from three days to a week before cutting. This ensures against plant scalding, minimises evaporation losses, and restarts the growth again immediately the crop is cut. When two waterings are necessary to one cut, irrigate after the growth is sufficient to protect the soil from the sun, and again just before the next cutting. All land intended for lucerne should be well and carefully graded, and whenever the subsoil is bared it should be heavily manured and thoroughly worked up, then left fallow for a season before it is planted. *Lucerne-Growing Without Irrigation.*—When we consider the success which attends lucerne-growing in other parts of the world under arid and semi-arid conditions, much of it planted in a primitive manner, it is reasonable to suppose that with a proper system of cultivation and a judicious selection of seed an immense

area of land might be profitably planted with this valuable fodder in our State. In California, which possesses a climate somewhat similar to ours, with an average rainfall of about 12in., and without artificial watering, from 1 ton to 4 tons hay crops per acre per annum are the rule. At Dickinson, in North Dakota, the Department of Agriculture is growing, without irrigation, no less than 217 strains of lucerne, including Turkestan (several varieties), Mongolian, Land lucerne, Nebraska Dry Land, Algerian, Mexican, Utah Dry Land, Arabian Dry Land, and Irrigation African Oasis, Guaramda, Ecuador, and Peruvian. Amongst these some are better adapted for dry land than others. In various parts of this State outside Goyder's line of rainfall lucerne plots are to be seen growing in most unlikely places and under the most adverse conditions. Some time ago, in the Coorong sandhills below Salt Creek, a small patch of lucerne which had apparently started from one seed, dropped possibly from a horse feeder (it was at an old horse camp), was found. The original plant had apparently been left alone by the stock and the rabbits, and in due course had seeded. There was now a patch of lucerne several yards in diameter. The plants were small, but they were growing on what appeared to be pure white sand in the midst of a stunted bush scrub. With the land properly cleared, cultivated, and manured the stand would have made a much more satisfactory growth. With an average rainfall of not less than 12in. on a sandy soil of 6in. or more in depth, provided the subsoil is a fairly retentive one, possessing a slow but sure drainage, there is no doubt that the more drought-resistant varieties can be grown. The land should be ploughed in winter as deeply as possible and rolled and harrowed (each day's ploughing being gone over the same day), then proceed as follows:—Keep down all weeds and carefully scarify the land after each good shower while the soil is damp. Sow from 6lbs. to 9lbs. of approved seed about April, so that the young plants may be permitted to make the most of the fall and winter rains. When sowing use about 50lbs. to 75lbs. of bonedust or super. per acre. It is advisable if possible to put the super. in a few weeks ahead of the seed, but this custom is regulated by the weather conditions, which may prevent it. The seed should be sown in damp soil to enable it to get ahead of the weeds which will germinate after the cultivation. Sow through the drill or broadcast; personally, I prefer the latter system. Go over it with a very light set of harrows or brush the seed in lightly and follow with a light roller to firm the soil around the seed to facilitate a more rapid germination. In many of our best farming districts, where fallowing and sheep-grazing are regularly practised, it is profitable to sow from 1lb. to 3lbs. of Turkestan or other approved lucerne with the wheat and manure. The plants must be allowed to blossom once a year if they are intended for a semi-permanent pasture, after which they may be grazed off in the usual manner. Stock should never be kept on a lucerne plot for longer than a fortnight. This necessitates smaller paddocks than usually obtain, but the gain in feed supplies and the lengthened life of the plant more than justifies the extra expenditure in fencing. Some six years ago, in the Morgan district, the Director of Irrigation sowed from 5lbs. to 6lbs. of reputed Hunter River seed per acre in a crop of Gluyas Early wheat which had stood out, then harrowed and rolled the land. Half the area, about 10 acres, was cut for hay and yielded 1½ tons per acre (prime mixed hay). The other half was left for wheat, from which was stripped about 14bush. per acre. Sheep were then turned into the paddock, when they rapidly improved in condition, cleaning off the straw with the green and partly dry lucerne. The lucerne seed germinated splendidly and made a fairly thick 'stand.' The crop remained for the first two years without irrigation, being above the water level; yet throughout that period it gave distinctly profitable growths after each summer and autumn rains. The average rainfall for the two years in question did not exceed 9in. per annum. A few points which are recommended to graziers and intending graziers are as follows:—(1) Sow suitable grasses with lucerne seeds on land intended for grazing. (2) Cut the first growth; do not feed it off. (3) Irrigate a week before stocking. (4) Use small enclosures which can be grazed off in at least a week. (5) Lightly graze the second growth when flowering. (6) If possible, keep water available for stock. (7) Give stock a full paunch before turning them on to the lucerne. (8) Do not remove them at night unless the weather is wet. (9) During wet weather not only do stock puddle the land and foul the feed, but 'bloat' risks are increased considerably. (10) Mark all stock showing signs of 'bloat,' and if again affected get rid of them from the lucerne area. (11) The greater size of the barrel in stock the less liability is there to 'bloat.' (12) Have suitable quantities of Stockholm tar, carbonate of soda, salt, and a few gags available on the spot; also carry a clean, sharp knife. (13) To cut at least one crop of lucerne (flowering) per annum increases the life and value of the plant. (14) Lucerne land intended for grazing should be particularly well graded and drained to secure the maximum results. (15) Cultivate with a disc harrow (set straight), or spading harrow, or

a lucerne rotary spike cultivator in May to August. (16) After the first cultivation apply from half a ton to a ton of lime or gypsum per acre on grazing plots over a year old. (17) Manure during the winter to the requirements of the soil and crop. (18) Use as much humus as it is possible to get hold of on grazing land. (19) Keep a close watch over the first year's operations and modify the practice if necessary."

Mr. E. E. Gill also contributed a paper, as follows:—"I do not think lucerne can be grown successfully without irrigation in this district. To begin with, it is advisable to select a fairly level piece of land of about 10 or 12 acres of deep, rich soil, fallow it in June, and plough to a depth of 4in. Keep it well worked through the spring and summer, allowing no weeds to seed. In autumn the land must be worked to a fine tilth before sowing. Twelve to 15lbs. of Hunter River lucerne seed and 2cwt. of bone super. to the acre should be put in. Use the drill, but keep the hoes out of the ground, dragging a couple of chains behind to bury the seed. The advantage of sowing in autumn is that the plants get a good hold through the ordinary wet season. Frost has very little effect on the Hunter River variety. Sowing in spring has the disadvantage that one has to begin irrigating before the plants are properly established. Flooding newly-worked land washes out a lot of the young plants, and displaces a lot of the soil, whereas the autumn-sown has a winter's rain on the ground, and the soil is fairly well set before it is watered in late spring or early summer. It is advisable to cut over the ground in spring with an ordinary mower, for although this may not appear to be worth while, it causes the young plants to stool out, and removes weeds that may have grown through the winter. Do not feed it off on any account. I have used water for years carrying up to 140 grains of salt and 40 grains of magnesia, and up to now it has had no ill effect on the ground. The method of raising the water has to be varied according to the conditions. If one has an unlimited supply, such as a running creek, or a well with a very large supply, say of about 10,000galls. to 20,000galls. an hour, a 10 horsepower oil engine with a 3in. centrifugal pump is the best. A vertical lift of from 10ft. to 30ft. will give from 20,000galls. to 10,000galls. an hour. The pump should not be more than 8ft. above the water, and the suction pipe should be 1in. greater than the pump in diameter. Petrol engines are not as good as oil engines for irrigating purposes, even with the smallest plants. The ever-increasing cost of petrol, the short life of the engine, and extra attention required, all go to put it out of the running as regards cost. Suction gas is cheaper than oil, but is only suitable for large plants. The best method of distributing the water is with fluming and 8in. galvanized iron pipes 12ft. long, with calico couplings. With reference to fertilisers, well-rotted farmyard manure is good. New stable manure encourages lucerne flea, and brings in weeds. Bone super. is the safest. It is well to cultivate the lucerne every year in August. Sow 2cwt. of bone super. and cultivate with a disc cultivator to a depth of about 2in. This will work in the super., kill a lot of the weeds, and loosen the surface of the ground. The ground must not become dry. A heavy flooding every four or five days will give from seven to 10 cuttings through the summer. Double the quantity is secured by cutting, the best time being when all the plants have flowered, say two or three days after the first flowers show: to leave it any longer encourages the lucerne flea. A windmill with a 1,000gall. tank, 1½in. piping, and 30ft. of 1in. hose with a spray will irrigate from quarter to half an acre of ground, which will give the milkers an occasional change of fodder. In the event of cattle becoming 'blown,' it is a good plan to keep the mouth wide open with a piece of board 4in. to 6in. in width, according to the size of the beast. This will relieve it in a few minutes, and is safer than the method of sticking with a penknife. I strongly advise farmers to have a patch of lucerne."

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

Blyth, May 17.

(Average annual rainfall, 16½in.)

PRESENT.—Messrs. A. L. McEwin (chair), J. S. McEwin, C. H. Zweck, J. Pratt, A. A. Schulze, W. J. Ninnis, J. J. Clarke, R. Buzacott, W. H. Best, F. T. Pedlar, T. Roberts, S. G. Shepherd, M. Williams, M. G. Best, J. B. Kirchner, J. F. Bishop, H. Neumann, J.

Kosters, E. C. Deland, J. T. Harmer, W. Reinke, jun., F. C. Williams, D. Eldredge, A. Dunstone, H. W. Eime, Dr. Heynemann, W. O. Eime (Hon. Sec.), and six visitors.

WHEAT AND THE PROCESS OF MILLING.—The following paper was read by Mr. E. C. Deland :—"This is probably a subject of which very little is known by the general public, although the products are so largely used. That wheat is grown in large quantities by the farmers, that it is turned into flour, &c., by the mills, and that it is one of the most perfect of foods for man and beast is generally admitted; and it is also supposed that the process of manufacture is very simple. It will be my endeavor by this paper to show you that there are very many points to be considered, and that the process of manufacture is far from as simple as is supposed. First of all wheat itself is a most important factor; the various varieties, where it has been grown, the climate and nature of soil it has grown upon, its chemical proportions, color, and other points all count in the production of a first-class flour. *Varieties of Wheat.*—Some of these predominate very much with the grower on account of their capacity to yield or their suitability for hay; their internal proportions are not as a rule greatly considered; but great and effective work in this direction has been done by such men as the late Mr. Farrer, of New South Wales, and others, besides the Agricultural Colleges and Bureaux of this and the other States within recent years, and although perfection is hard to attain, some very fine new varieties have been produced, notably, Federation, Comeback, Bunyip, Gluyas, Smart's Early, and many other good milling sorts being in fairly general use. Other varieties, as King's Early, King's Red, Medea, are good hay wheats, but not good for milling purposes. The first consideration from a miller's standpoint is the suitability for grinding. A clear, medium hard, and tough wheat, plump in shape, with a thin, clear, golden skin, is most desired; and as examples I name at present Federation, Comeback, Smart's Purple Straw, and Bunyip. A tough and sound wheat is necessary in order to perfectly separate the grain into the various parts without unduly mixing the particles. Milling aims at keeping the flour, bran, and pollard as pure as possible; hence a wheat that can be split open without unnecessarily breaking the skin, so that flour can be scooped out, as it were, is the ideal, producing clean pure flour, large flaky bran, and sharp gritty pollard. The locality in which the wheat is grown has much effect upon the milling properties and the chemical proportions of the grain. Wheat grown upon the high lands, with a cooler or wetter climate, from soil containing a large proportion of humus or decayed vegetation, is nearly always plumper, thinner in the skin, has a larger proportion of white flour, and in that flour a greater proportion of starch. It is consequently softer, and easily ground, making a white, weak flour. Wheat from the low lands—limestone country and rubble soils, with a lesser amount of moisture—produces a smaller wheat, shotty and hard, thick in the under skin or shell of the grain, with a rich, golden color. The flour is more dense and strong, has a yellow tinge, and is high in gluten contents, making what is called a yellow, strong flour. Wheat from the plain lands—deep loamy soils and alluvial flats—with a good average rainfall, is almost perfect in itself, it being firm and tough, of good average size, clear but tough in the skin, producing a fine, flaky bran and a clear, creamy flour fairly high in gluten contents, and easily and satisfactorily ground. The varieties of soils, as apart from the locality, also greatly affects the internal chemical proportions, as the limestone produces more phosphate, sugar, and nitrogen. The rich, red land gives more iron, and the black soils more soluble and fibrous parts. So that the ideal miller's mixture has to be obtained by carefully considering, not only the varieties of wheat, but the class of land and the locality from which it comes. A personal knowledge of the district, the fact that all varieties of soils exist within it, practically three climates, and the facilities to thoroughly mix the wheats after knowing the different class of land and the locality from which it has come, is a great advantage at the start, as against those who cannot get this personal knowledge; hence one cannot wonder at a miller's care in selecting and sorting the wheat into different stores, or disposing of those varieties or grades that do not give him the very best results. So much for the first step in successfully treating the wheat. The next point is a practical knowledge of the chemistry of the wheat, and its character for grinding, and how to test the product as being ground. A miller, if up to date, is not just an overseer of machinery, but must have a thorough practical knowledge of machinery, and of the special kinds used in milling in particular; and be gifted with an instinctive knowledge as to how and why, a keen sense of touch, and good eyesight. Much of the machinery used is very powerful, and built to stand continuous vibration and strain, yet is so delicately adjusted that it can be controlled perfectly. The knowledge of chemistry is required because of the food properties of the various constituents of the grain, and in testing the flour for gluten contents, strength, and starch. Flour consists of carbon 6 parts, hydrogen 10, oxygen 5, in the following forms, and is crystalline in shape:—Wheat flour contains water, 12; sol. albumen, 1.5;

gluten, 8.5; starch, 74.5; sugar, gum, 2; mineral, 0.5; fat, 0.5; cellulose, 0.5—total 100. The bran contains a much larger proportion of cellulose (18), and mineral (7 per cent.), is fibrous or flaky, and not easily torn apart. Pollard contains a greater proportion of albumen (19 per cent.), fat (9 per cent.), gum, &c., and fine particles of bran and germ, that if allowed to pass into the flour would discolor it and prevent a light, large, creamy loaf being produced. The first and most usual method of testing the flour is by placing a small quantity upon a specially-shaped board or tin, pressing it down firmly to form a smooth surface with a bone or silver-plated pat, and then sliding the whole into a receptacle of clear rainwater, withdrawing it after a few minutes. This will immediately intensify the color and show up any dark or yellow spots that would mar the purity of the flour; and if several different flours are placed side by side, the least shade of difference is easily detected. After taking the samples from the water, if they are allowed to drain and dry slowly in a dustproof place, the test can be further proved, as the strongest flour, i.e., the one that will absorb most moisture, will curl up the most without cracking, while the weakest flour will remain flat, and the very poor flour split into fragments without curling at all. The color will also be much emphasized, as the yellow specks or branny particles in the poorer flours will swell and spread, while the white, weak flour will remain dead white and lifeless. The stronger and best flour will have a clear, crisp, creamy appearance, with plenty of curl or life. A second test can be made by placing measured quantities of flour into test tubes after mixing with pure water, and warming these gradually to a certain temperature, when the strongest flour will rise the highest and remain so. A very weak flour will, after rising, recede to almost its original bulk. A third test is made by thoroughly washing a certain quantity of flour until all the starch has been abstracted. The gluten content, which forms a spongy mass, is carefully weighed first wet, then dry, to ascertain the exact proportions. It is not the dead, snow-white or starchy flour which makes the best loaf of bread, but the clear, creamy flour, which makes the large, light, thin-crust loaf. Although the most simple of foods, flour is by no means easily produced. Great care and continual adjustment of powerful and complicated machinery are absolutely necessary, or many tons can be completely spoiled in a very short time and in a very simple way. The first step towards milling the wheat is the blending of the various varieties and qualities. This is usually done by emptying the grain into large hoppers or bins, from the bottom of which it is drawn off, and runs or is raised by elevators into other bins, usually passing through a simple grader before entering the second bin, which removes particles of straw, heads, sticks, stones, bolts, nuts, nails, lumps of soil, &c., &c., and all foreign objects that are much larger than the grain, and which might do considerable damage in the more complicated machines. This machine also sucks up, by wind power, a large amount of dust and chaff. The grain next passes into a storage bin, which supplies the wheat separator and scouring machines, &c. The first machine separates all the backbones, screenings, barley, oats, drake, &c., by passing the wheat over a series of sieves, each one slightly different, at the same time applying a very strong wind suction, which lifts out all lighter grain or materials. The heads or grain in husks are passed through a thrasher and returned over the sieves, while the screenings, oats, &c., are crushed through small rolls and sold as horse feed. The separated grain then passes into a scourer, into which it is fed at the top, falling gradually between an outer cylinder of punctured steel and the face of a number of chilled steel plates covered with thimble-like knobs. These plates revolve at from 700 to 800 revolutions per minute, and scour and rub off all the thin outer skin of the wheat, loosens a proportion of the germ and the hair and particles of earth which may have been adhering; the dust resulting is drawn off by a very powerful fan, so adjusted as to lift everything lighter than the wheat. This dust is commonly called stive, or smut-dust, and is useless on account of the large proportions of fine earth and smut it contains. The scoured wheat then passes through an ordinary round reel or screen, which takes out all loosened germ or small wheat, which is also crushed and sold as horse feed. The cleaned wheat then travels along a spiral screw at the head of which is the damping apparatus. This consists of an automatic arrangement whereby the wheat is steamed or water is dripped or sprinkled upon and thoroughly mixed into it, sufficiently, according to the weather, to give the outer skin a toughness necessary to prevent it tearing up too much in the grinding. After allowing the wheat to lie in a bin long enough to condition evenly, it is again passed through a scourer, only treated more gently by brushing and polishing, so that it is left thoroughly free of skin, hair, dirt, or loose particles. The grain is then ready for the milling, excepting in special cases or under other systems, when washing and drying or steaming is done, or a slight variation of the above process is adopted. In milling the grain, the first point is to regulate the feed of the wheat to the rolls so that a constant and uniform flow is obtained. This is done by using a very ingenious little machine called a feed governor, consisting of a series of brass plates delicately hung and balanced over which the wheat flows in an

even stream, the least variation in the weight causing an immediate automatic adjustment of the inlet valve. It can be set for any required number of bushels or pounds per hour. The wheat now passes into the first break rolls. These are so set that it is just split open and a small quantity of flour and other particles are set free. The coarse, meal-like product is then passed over wire gauze and silk sieves or screens of various sizes, which separate this meal into five or more different sizes, each of which class of stuff is sent on to another machine to be further dealt with. The coarsest of these is passed through the second break rolls, which reduce it again to a meal, loosening more flour, &c., and cutting it into chunky lumps, leaving the bran in large flakes. The rolls used to do the first and second breaks are corrugated, or grooved, with saw-like teeth, and vary somewhat in size and shape, according to the system adopted and the class of material to be dealt with. The principle adopted is to gradually reduce the flour, after having stripped off the bran, by a series of rolling or crushing between rollers set at exact distances apart, and after each rolling to pass the material over sieves or screens covered with silk gauze, each time taking out the finer particles of flour and sending on the coarser particles to be further reduced, until the whole has been turned into either flour, bran, or pollard. The coarser particles of flour with a certain amount of pollard attached are called middlings, and the great aim in good milling is to thoroughly clean these middlings before passing them on to be further reduced. The flour must not be rolled too much, neither must the middlings be crushed all at once into flour. If this be done and the flour and middlings re-rolled while mixed, only a muddle will result, and what would otherwise have been clean flour is dirtied and spoiled by the mixing in of very fine particles of pollard or bran. On the other hand, if the flour is rolled too much, it becomes soft or killed, losing all its capacity of expansion. The particles of bran and pollard being fibrous and tougher than the tiny crystals of flour are not broken up so easily, but the tiny crystals of pure flour crumble like sugar, and it is by remembering this fact and aiming at a clean separation every time that the purest and best product is manufactured. This continual separation of particles is performed in many different ways by the various sieve machines. Not only is the material sifted, but strong and varying currents of wind are employed to lift out the lighter particles. Over each set of rolls a pipe draws off the warm air laden with tiny particles of killed flour or filmy flakes of bran and pollard, which would spoil the flour if left in the machines. In the purifier a very strong suction fan is employed to lift out the filmy flakes of bran from the material, while the silk with which the trays are covered is divided into five or more sizes, each different lot passing on into sets of rolls to be reduced again. The number of sets of rolls employed in a mill depends entirely upon the system adopted and the capacity of the mill. To make 1,000lbs. of flour per hour, and the equivalent amount of bran and pollard, at least 10 pairs or rolls of varying lengths are required, the usual diameter being 9in. In the most modern machines the diameter is being increased, while the length has also increased up to 3ft. 6in. This is due to the great improvements in the bearings and the adjustment, greater length and grinding surface giving much better results, at the same time reducing the pressure required. Purifiers, centrifugals, reels, and sifting gyrators are employed. The centrifugal is a revolving frame covered with silk, inside of which beaters revolve, tossing the flour against the revolving silk, while a brush on the outside keeps the silks from clogging. The fine flour is taken off by a screw or worm under the machine, while the coarser particles pass out at the end to be ground again. A reel is a silk or wire gauze covered machine, which revolves but has no brushes inside, and is usually placed before the centrifugal to prevent any foreign bodies or very coarse particles from passing into the centrifugal and damaging the silk. The sifter or gyrator is a massive machine, hung or supported upon rods, and swung in a rotary manner imparting a very gentle action, a method now much preferred to the older styles. This machine contains a large number of trays covered with different sized silks, and the material passes from one to the other until all is divided into a large number of sizes, ready to go on to the following machines. There are numerous other less important machines used, as dust collectors of various kinds, stive collectors, small screening rolls, mixers for various purposes, aerator for aerating the flour before it is bagged, patent bagging machines or fillers capable of packing any sized bags with flour to the required quantity, bran and pollard packers, &c., all of which have to be kept in perfect running order and adjusted for the required work. The dust collectors are ingenious machines, one style acting upon the principle of the whirlwind, or centrifugal force; the other is a multitude of woven pipes into which the dust-laden air is blown, and which pipes are cleaned by a most simple yet unique method, and the material collected and made good use of." With the aid of two large diagrams the construction of a grain of wheat was explained, and on the conclusion of the paper a number of questions were put and answered.

Friedrichswalde, May 17.

(Average annual rainfall, 18in. to 19in.)

PRESENT.—Messrs. P. Goodfellow (chair), F. W. and E. Duldig, F. W. Schütz, G. Grope, J. and F. Heintze, R. Marlow, T. Pfitzner, J. B. Coombe (Hon. Sec.), and seven visitors.

SHEEP ON THE FARM.—In a paper on this subject Mr. J. B. Coombe said that in a district such as this, where fencing was comparatively cheap and feed and water were available in abundance, sheep were of considerable value on the farm. Every farmer should keep at least 50 of these animals, and whilst there might be a rather large outlay in the first place this practically constituted the only expense. A substantial sheep-proof fence could be erected by using five No. 8 wires and one barbed wire. The former should be set respectively the following distances from the ground:—7in., 14in., 21in., 29in., 30in., the barbed wire being placed on top. Six plain wires instead of five would perhaps be more satisfactory. For breeding purposes he favored the purchase of four to six tooth Merino-Shropshire ewes. These were well-formed, hardy, good doers, splendid mothers, and as a rule quiet. When crossed with a Shropshire ram of full mouth the resultant lambs should develop quickly and command good prices for export purposes. The gain in the value in these lambs compared with those of other breeds more than compensated for the loss in weight and quality of the wool secured from the ewes, and generally the sale of the lamb together with the price realised for the wool would pay the original outlay for the flock. Apart from these direct benefits there was the increased fertility of the soil which resulted from the droppings of the sheep. They did a great deal to keep down the weeds, and in this manner a considerable amount of cultivating was obviated. Members generally agreed that a small flock was profitable on the farm. Some preferred Merino ewes to the crossbred, and doubted whether a five-wire fence would effectively block Merino-Shropshire ewes.

SEEDING.—At a previous meeting this subject was dealt with in a paper by Mr. P. Goodfellow. It was of the utmost importance, he considered, to sow nothing but good, clean, graded seed. Where dirty and inferior seed was distributed, not only was there a likelihood of less wheat being put on the land than was intended, but frequently the seeds of weeds also were spread. At least three varieties of wheat—one early, one medium, and one late—should be sown, the late wheat being put in early and the early wheat late. For picking the seed he favored dipping it in a cask or a pickling machine. This resulted in the grain being uniformly covered with the pickle, and involved less labor and time than floor pickling. He used a 2 per cent. solution of bluestone, the bluestone having previous to mixing been dissolved in boiling water. Where floor pickling was undertaken he recommended $\frac{1}{2}$ lb. of bluestone to a bag of wheat. Seed sown under dry conditions should be drilled before cultivating to secure a more even distribution of the manure. The manure tended to draw moisture, and as a consequence there was a probability of the seed malting if it was in contact with the super. After drilling, the land should be harrowed. A quarter of a bushel of seed and 75 lbs. of manure per acre was best for this district. Members generally agreed with the ideas expressed by the writer of the paper.

Gawler River, April 18.

(Average annual rainfall, 17in. to 18in.)

PRESENT.—Messrs. W. Rice (chair), E. Winckle, F. W. Roediger, F. Bray, W. Richter, J. Hillier, W. J. Dawkins, C. Leak, C. Leak, G. Higgins, J. H. Dawkins, B. F. Hillier (Hon. Sec.), and three visitors.

AFFORESTATION.—Mr. F. W. Roediger initiated a discussion by reading the address given by the Conservator of Forests at the conference of South-Eastern Branches (printed on page 1013 of the April issue). Mr. W. Richter did not think it advisable to plant timber on sandhills in this district, as in his opinion good timber could only be grown on good soil. Mr. Rice thought that timber-planting would not pay on land that was worth £10 per acre. Mr. F. Bray thought Government land should be cleared of matured timber and planted systematically, but Mr. Winckle favored the reservation of the natural timber. Mr. Hill (a visitor) thought the Government would be well advised to plant timber on a large scale, and individuals should make a practice of providing a shelter for stock in this way. Lincoln wattles, when planted with gums, made splendid breakwinds, and provided firewood. Mr. Leak emphasised the fact that stock would do better in timber-sheltered country. Mr. J. H. Dawkins thought the planting of timber for firewood was a matter of little importance, as he believed electricity would take the place of this in the near future.

Gawler River, May 16.

(Average annual rainfall, 17in. to 18in.)

PRESENT.—Messrs. W. Rice (chair), C. Leak, J. Hillier, F. Bray, A. J. Bray, W. Richter, E. Winckel, G. Higgins, H. Dawkins, N. J. Pederick, H. Dunn, F. W. Roediger, A. C. Dawkins, B. F. Hillier (Hon. Sec.), and four visitors.

MIXED FARMING.—Mr. W. Richter read a short paper, in which he stated that every farmer should practice mixed farming. He would then at all times have produce for sale, and thus secure a regular income. Over-stocking should be guarded against. The best cows for butter and milk were the Jerseys, and in his opinion the most profitable pigs were the crossbred or mongrel. These were more prolific than the purebred animals. The most suitable fowl for the farmer was the progeny of Leghorn hens crossed with an Indian Game cock. The cockerels could be sold as table birds, and the pullets would be found good layers. American Bronzewing turkeys would be found to do well where they were given considerable area over which to roam. The breeding of horses was advised, the farmer being recommended to breed from the best mares in his possession. Mr. A. Bray did not think mixed farming was advisable. On small holdings this was necessary, but where larger areas were being cultivated one man could not give the time to the number of side lines mentioned by the paper writer. Mr. C. Leak believed in keeping well-bred pigs. He had been successful with White Yorkshire sows crossed with a Berkshire boar, the progeny selling well as porkers. Mr. H. Dawkins thought crossbred pigs more prolific than the purebred, and with Mr. Pederick did not think the Jersey the best cow for the farmer. A larger animal was more profitable, the Shorthorn for preference. Mr. Higgins favored the Jerseys as butter producers. They were heavy milkers and consumed considerably less food than other breeds. Mr. Winckel would rather keep ducks than fowls, as the latter did considerable damage to haystacks, and were more troublesome in the stables. Mr. White mentioned that where fowls and ducks were kept together the drinking water of the former should be placed out of reach of the ducks. Hot mash in the morning and wheat at night constituted a good ration for ducks kept for laying.

Lyndoch, May 15.

(Average annual rainfall, 23.01in.)

PRESENT.—Messrs. A. Springbett (chair), E. Filsell, H. Kennedy, H. Schrader, H. Klauber, H. W. Lawes, H. O. Kooh, F. W. Mattner, W. Kies, G. W. Warren, E. Springbett, P. N. Burge, and Hon. Sec.

INSPECTION OF BROOD MARES.—Mr. G. W. Warren introduced the subject of inspection of brood mares. He expressed the opinion that only secondary to a good stallion was the necessity that farmers should breed from the best mares. There was sure to be opposition to the scheme; but all the same it was in the interests of the breeder, the district, and the State. This move would tend to raise the quality of the stock. Then it would be possible for the farmers in a district to breed a strain of farm horse that would become noted for certain desirable qualities, such as uniformity in temper, activity, and general usefulness above the present average farm horse.

Nantawarra, April 17.

(Average annual rainfall, 15.19in.)

PRESENT.—Messrs. R. P. Uppill (chair), S. Sleep, W. Smith, A. F. Herbert, J. Sinclair, W. Greenshields, T. Dixon, F. J. Sutton, E. J. Herbert, and G. L. Tucker (Hon. Sec.).

QUESTION BOX.—In reply to a question, Mr. Smith considered oats better than wheat to sow on the unfallowed crowns of sandhills. This crop seemed to do better on sandy soil, and unfallowed sandhills would generally be somewhat sour. Mr. Sleep thought it depended on the season as to which would be the better crop. Asked whether cultivating at this time of the year was likely to encourage takeall, Mr. A. F. Herbert said that where there were weeds growing on the fallow he would have no hesitation in continuing with the cultivator. Mr. Sutton had not experienced trouble with this disease in his crop when he had worked the land in a dry state. Cultivating could not be overdone so long as the working was not too deep. A good germination of weed seeds would quickly result after rain. Mr. Smith had noticed that the summer working of fallow was recommended, and that the evaporation of moisture thus prevented was measured as the equivalent of inches of rainfall. While Mr. R. P. Uppill favored shallow working,

he did not think any working would prove harmful so long as the fallow had been properly worked previously. Last year his crop was not affected with takeall, although it had been worked at this time of the year.

Nantawarra, May 15.

(Average annual rainfall, 15·90in.)

PRESENT.—Messrs. R. P. Uppill (chair), T. Dixon, J. Nicholls, R. D. Nicholls, W. Smith, J. Sinclair, E. J. Herbert, S. Sleep, W. Greenshields, and G. L. Tucker (Hon. Sec.).

PICKLING WHEAT.—Mr. Nicholls explained that bunt was a parasitic or fungus growth. The spores required less moisture to germinate than wheat, consequently when wheat was sown in a dry state there was frequently enough to germinate the bunt balls, but not the wheat; the bunt having no host plant on which to subsist died, and when sufficient rain fell to germinate the wheat it grew free of disease. Bluestone was the most effective preventive. It had been found that smut was not so prevalent in seed wheat that had been reaped with the harvester. Mr. Sleep had treated all his seed wheat with a bluestone solution, but part of the crop was affected with smut. Mr. R. P. Uppill pointed out that it was very easy to contaminate clean wheat. Last year he sowed some wheat which had been affected with smut, and omitted to clean the drill before sowing another variety. The result was that the first half-day's sowing of the latter was affected with smut, whilst farther over the crop was perfectly free of it. Mr. Dixon mentioned that frequently the wheat was not soaked sufficiently to secure the thorough destruction of the bunt balls.

HARROWING BEHIND THE DRILL.—Mr. Smith last year assisted Mr. Sinclair with his seeding. A much better germination was secured from the part drilled by Mr. Smith than that drilled by Mr. Sinclair, who was using harrows behind his drill. This was attributed to the fact that water collected in the furrows made by the drill, whereas these were destroyed by the harrows.

SUMMER AND AUTUMN FALLOWING.—The following paper was read by Mr. R. P. Uppill :—"Fallowing in summer and autumn is of considerable advantage. It enables the farmer to increase the fallowed area of the farm with but little additional cost. The plant used for ordinary winter fallowing is sufficient to do the extra quantity. In any case it minimises the cost of the work, which is a considerable item, as I look upon winter fallowing as the most costly operation on the farm. In winter the land is in its heaviest state, and the horses are not in such good heart as they are at any other period of the year. The draught of the plough is considerably greater, and the land is heavier for the horses to walk upon. A five-furrow plough, which requires nine horses in winter, can be worked more easily with eight in the earlier part of the year, and a greater area can be gone over in a day. I advocate ploughing to about 4in. deep, but the depth is usually determined by the class of land. There is nothing to be feared in bringing the land up rough and lumpy with the plough, as the dry clods, under the influence of the rain of winter, expand and crack, and when worked with the harrows or cultivator later on will very readily form a good tilth, as they are not matted together with tough roots as is often the case with land ploughed in the winter if there happens to be a period of dry weather, a thing not at all uncommon. Land fallowed before winter goes down to some extent by the action of the sun and rain, and this is greatly assisted by the treading of sheep while grazing thereon. The rubbish needs to be kept down until the portion of the fallowing left for winter is finished, and the teams can begin to work the early fallow, which naturally retains a greater amount of moisture than the winter ploughed land. If the holding is not large enough for the farmer to continue fallowing until he thinks it advisable to begin working down, he will be at an advantage by having a portion of that all-important work done before seed time, and it will enable him to give it early spring working, which is indeed a very important factor. In many cases it is an advantage for the farmer to have his teams at work fallowing in the late autumn while waiting for rain, to enable him to commence seeding, as little or no work can be done on the fallow already prepared for the crop, and he has to feed his teams, which is no small expense nowadays considering the increasing cost of production. This will help to increase the area under cultivation, and will, on the average, increase the yield per acre. There will not only be a lessening of the risk that is attached to late winter fallowing, but even with additional working the latter will not be in the same condition as the early at seeding time. Not only is the crop likely to be dirty, but there is a greater risk of its being affected by takeall. This disease, I feel satisfied, is in most cases brought about by late fallowing, which does not allow the farmer an opportunity to starve or work it out of the land. Early fallowing ensures early working; early working ensures better working;

better working means less working; and finally, with but few exceptions, better results are obtained." Mr. E. J. Herbert said the idea of summer fallowing was a good one, and although the feed was lost yet the land had every opportunity in the way of securing benefit from the rains, &c. Mr. R. D. Nicholls had done a little summer fallowing this year. The ground was not hard to plough; eight horses on a six-furrow plough showed no signs of distress. It certainly destroyed the feed, but buried the seed, which came up with the first rains. He agreed with the views expressed in the paper. Mr. Dixon did not think summer fallowing any easier on the horses. The ground was hard and the weather hot, while in winter, if the ground was not too wet, it appeared to turn up much easier. Mr. Smith thought summer fallowing had much to commend it. He had noticed other districts in which it was in vogue, and the results compared very favorably indeed with those of this district. It was well worthy of a trial. Mr. J. Nicholls thought it had yet to be proved that the practice would increase the yield.

Salisbury, May 6.

(Average annual rainfall, 18½ in.)

PRESENT.—Messrs. Moss (chair), McNicol, E. V. Harvey, Tate, Frost, Bussenschutt, Shepherdson, Neal, Bagster, Whittlesea, Urlwin, Baylis, Day, and Jenkins (Hon. Sec.).

SYDNEY AGRICULTURAL SHOW.—Mr. McNicol gave an interesting account of a visit to the Sydney Agricultural Show, which extended over a period of eight days. Various exhibits were described and comparisons made with those of South Australia.

Two Wells, May 20.

(Average annual rainfall, 16·36 in.)

PRESENT.—Messrs. W. S. Cordon (chair), A. Pratt, R. Baker, H. R. Hayward, J. Williams, E. H. Green, H. Pederick, J. J. McCord, L. H. Dawkins (Hon. Sec.), and one visitor.

EXPERIMENTAL PLOTS.—Mr. Pratt gave an account of some small experimental plots which he had conducted with various manures, in which the tests were carried out with a few hundred grains in each instance. He also spoke of experimental plots in some of which the seed had been drilled and in others broadcast, the latter giving the better results. Deep drilling was not favorable for heavy cropping in this district.

Watervale, April 21.

(Average annual rainfall, 27·17 in.)

PRESENT.—Messrs. E. E. Sobels (chair), F. Burgess, J. Scovell, F. Field, W. Tavender, W. Smith, A. Davis, P. Dunstan, G. Parker, F. Hamp, D. Guthrie, J. R. Hamp (Hon. Sec.).

BLACK SPOT (ANTHRACNOSE) ON YOUNG VINES.—A discussion on this subject took place. Mr. Guthrie suggested the treatment of vines affected with this disease with sulphur. The Chairman recommended a dip of iron sulphate solution when the vines were dormant. Mr. Burgess had mopped 12-year-old Sultana vines with a solution of 7lbs. sulphate of iron and ½ lb. of sulphuric acid in 2galls. of water. The first growth was apparently quite free from the disease, but after a frost the second growth was badly affected. [The Horticultural Instructor (Mr. Geo. Quinn) says—"The remedy used by Mr. Burgess is a world-wide accepted one, though in some quarters a very weak solution of sulphuric acid only has been used. For dealing with vines prior to planting, they could be dipped in the solution down to where the roots begin, and if the tops are large they might be pruned first. For treating the established vines, all the prunings should be carefully burned and the whole of the spurs or rods left from the previous year's growth completely swabbed with this solution of iron sulphate and sulphuric acid. It is also an advantage to remove the old rough bark from older wood near the bases of the young shoots, as this permits more effective work. This solution is corrosive on flesh or clothing, and precautions should be taken. Fumigation with sulphur has not proved to be of any value in the suppression of this disease when the plants are dormant, and it is highly injurious to any plant with foliage."—Ed.]

Watervale, May 19.

(Average annual rainfall, 27·17in.)

PRESENT.—Messrs. E. E. Sobels (chair), F. L. Burgess, A. Burgess, F. Burgess, W. Tavender, W. Smith, H. Baker, F. Hamp, G. Parker, J. R. Hamp (Hon. Sec.), and one visitor.

MANURING FRUIT TREES.—In initiating a discussion on this subject, the Chairman explained the root system of fruit trees, and mentioned that the fibrous roots tended to grow toward moisture and plant food in the soil. If manure or water were placed too close to the tree, the roots would cluster around the taproot, whereas if the manurial dressing were placed away from the stem, the roots would tend to spread. The most suitable dressing in his opinion was a mixture of two parts of super. with one of potash. the best time to apply same being when the sap was beginning to rise.

ORANGE TREES.—Mr. Smith mentioned that it was not usual to prune orange trees, but he thought it necessary to cut out dead wood and thin them occasionally. With this view members generally agreed.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Maitland, May 1.

(Average annual rainfall, 19½in.)

PRESENT.—Messrs. S. G. R. Smith (chair), H. Bawden, A. Heilemann, J. Hill, E. G. Jarrett, H. G. Tossell, F. P. Wundersitz, and C. Pitcher (Hon. Sec.).

TREE-PLANTING.—In a short paper on this subject Mr. Bawden advised planting about one quarter of an acre of trees in each corner of hundred-acre paddocks. The beds and banks of creeks might also be utilised for this purpose, and waste land, when fenced and planted, might produce good timber. It was only necessary to dig a shallow hole for each tree, and, after planting, to protect the young trees from the stock during the first few years. The trees could be planted 10ft. apart, in rows, and the alternate ones thinned out later. The sugar gum was the best and fastest grower for Yorke's Peninsula. It was hardy, and protecting fences could be removed when it was from five to seven years old.

HARROWING GROWING CROPS.—Mr. Hill read a short paper. If the growing crops were harrowed with sharp tines after rain when the ground was moist, he said, the hard crust of the soil would be broken, moisture conserved, and weeds destroyed. However, before the harrows were put on the wheat should have developed good strong roots, and the crop should have been fed off with sheep in order that the flag would not cling to the tines, and the plant thus be pulled up. The feeding off checked the forward growth, and the wheat stood much better; in addition, there was the value of the droppings of the animals. Mr. Jarrett favored the practice, but thought the weeds secured too good a hold if the crop was left too long. He had put the harrows over the crops two and three times with good results. Little was gained by harrowing clean land. The majority of members thought it advisable to harrow crops, but feeding off was not always advisable. In reply, Mr. Hill said sheep should be put on early maturing wheats early. The harrowing should be in the same direction as the drilling.

Moonta, May 10.

(Average annual rainfall, 15in.)

PRESENT.—Messrs. J. Atkinson (chair), J. Lawry, C. Nankivell, R. A. Hancock, J. M. Bowering, W. B. Stacey, H. Fuss, R. C. Kitto, W. J. Brinkworth, L. Howlett, W. F. Orloff, T. Laidlaw (Hon. Sec.), and three visitors.

BEST WHEAT FOR DISTRICT.—In view of the results of the past harvest, members considered that for hay crops King's Early and Marshall's No. 3 mixed with Calcutta Cape oats were best. Their preference for grain varieties was as follows, in the order

given :—Yandilla King, Marshall's No. 3, Gluyas, King's Early, Federation, Silver King, and Carmichael's Eclipse.

BLACK RUST (Flag Smut).—Mr. W. J. Brinkworth had noticed that flag smut was more prevalent in wheat that had been sown in dry weather. Mr. Nankivell thought there was more trouble with this disease when the wheat was drilled in deeply. Mr. R. H. Hancock had found Federation more subject to flag smut than any other variety he had sown.

FORMALIN FOR PICKLING WHEAT.—Mr. F. Orloff favored the use of formalin for pickling seed, as a greater percentage of the grain germinated than was the case when bluestone was used.

WESTERN DISTRICT.

Colton, April 26.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. E. H. Whitehead (chair), P. P. Kenny, R. Hull, Gerald Lewis, E. R. DuBois, M. D. Kenny, Geo. Lewis, and L. Larwood (Hon. Sec.).

RABBIT DESTRUCTION.—Mr. P. P. Kenny read a paper on this subject, from which the following is taken :—"With a little expense and united action the rabbit could be kept under a good deal better than he is at present. As far as this district is concerned there does not appear to be such a thing as fencing the rabbit either in or out. In some districts the pest never burrows under, and it is only necessary to erect a good fence, keep the gate shut, and the rabbit question is solved; but in this locality, owing to the soft sandy nature of the ground, I am very doubtful if one could erect a fence around any one section under some part of which the rabbits would not burrow in a week if hungry. On small holdings of 1,000 acres or less one man with a shovel and a good pack of dogs can do a great deal. My experience goes back about 35 years in the hundred of Moorowie, near Warooka. I only held 640 acres of land, not much unlike the land in this district, and with a pack of dogs the pest was soon got under. For the district of Elliston as a whole nothing comes up to the poison cart and phosphorised pollard; but what is the good of either poison carts or phosphorised pollard if they are not used continuously? The right time to use the poison cart is not when the rabbits are to be seen in hundreds, but when they are scarce. It is better to destroy one rabbit in June than his progeny, which may be 100 or more, in January. I understand there have been quite 20 rabbit ploughs brought into the district during the last 12 months. The comfort and usefulness of the poison plough, that costs about £21, well repays the outlay of the extra £5 or £6. This year, early in March, we ploughed in a lot of burrows; this practice is a very good help, but is rough on horses. It is wonderful, however, how horses that are used to it get over burrows that cover a good deal of ground. The phosphorus that has to be dissolved on the farm is the best, but there is the danger of fire. I think all rabbit poisons should be required to carry a Government stamp as to quality. Several fires were started last summer in the Streaky Bay district by rabbit poison." The writer then dealt with various proprietary lines which he had use for poisoning. Although it was practically impossible to exterminate the rabbits whilst there were thousands of square miles of unoccupied land, much more than was being done at present could be effected.

Coorable, April 19.

PRESENT.—Messrs. C. T. Giles (chair), W. H. Wheadon, S. Riddle, L. Baanett, F. Woodforde, F. Underwood, E. Oats, E. Stretton, B. Giles, G. Menzel, W. G. Wheadon, G. Riddle, F. Gurney, T. Gurney, H. Hobbs (Hon. Sec.), and three visitors.

PLOUGH ATTACHMENT.—Mr. W. H. Wheadon tabled two diagrams of an eight-horse attachment for the plough—one showing swings for each individual horse, and the other without the small swings and utilising leading chains and spreaders. Discussion followed,

Mr. Giles always used swings for each horse, as he thought by that method there was less chafing of the animals' sides. He had found horses step on and break spreaders when starting up. Chafing could often be attributed to the incorrect length of the couplings. The majority of members favored the use of leading chains and spreaders, one reason being the saving in weight and another the saving of a lot of S links, eye-bolts, &c.

Elbow Hill, May 17.

(Average annual rainfall, 11 in. to 12 in.)

PRESENT.—Messrs. E. R. Wake (chair), S. V., A. C., and P. C. Wake, F. Froeth, A. R. S. Ramsey, H. Wheeler, G. F. Wake (Hon. Sec.), and one visitor.

CARE OF FARM IMPLEMENTS.—This subject was dealt with in a paper by Mr. Ramsey, in which he urged farmers to carefully overhaul implements and machinery before putting them away. A shed 60ft. x 16ft. should provide sufficient cover in this regard for most farms, and iron for roofing this could be procured for about £10. This would provide a catchment for water, and was better than straw. Stone walls raised to a height of 10ft. were best. In discussing the subject, Mr. S. Wake emphasized the necessity for cleaning machinery and repairing breakages before storing it. Mr. Froeth preferred a straw-roofed shed, as it was cooler. Mr. P. Wake thought the cost of the iron roof, as mentioned in the paper, underestimated. Mr. E. Wake preferred a square shed into which the implements could be put two deep; they would then be less exposed to the sun. The Hon. Secretary made a practice of giving his machinery a coat of double boiled oil annually. A shed of the size mentioned in the paper was too small for the average farm.

Green Patch, May 19.

(Average annual rainfall, 26·56 in.)

PRESENT.—Messrs. F. Gore (chair), T. Freeman, R. Chapman, G. Sinclair, C. Dorward, A. Murray, E. M. Sage, C. J. Whillas (Hon. Sec.).

DRAINAGE.—The Hon. Secretary stated that this district could well look to the Kybybolite Experimental Farm for information and guidance, as the soil and climatic conditions were very similar. The success which had attended the laying down of cheap surface drains in that district might also be secured here. On many of the paddocks a great amount of surplus winter water could be run off if a number of deep plough furrows were put in judiciously. Most of the paddocks were undulating, and provided a good fall for drainage. Mr. Sage did not think this would be effective, as, in his experience, the soil a few yards from the drain remained in a boggy condition. Mr. Freeman thought a good furrow would carry off a good deal of water, and this would go a long way towards preventing the water-logging of the crops.

MANURIAL DRESSINGS.—Mr. Sage expressed the view that better results were received in this district from dressings of super. of 75 lbs. per acre than were secured from applications of 150 lbs. Messrs. Murray and Dorward said that, in their experience, which had extended over a considerably longer period than that of any of the other members present, it paid to use up to at least 1 cwt. of super. to the acre.

SHANNON EXPERIMENTAL FARM.—Mr. Freeman stated that farmers who knew the farm did not agree with the official statement that this farm, owing to the great variation of the soil, was unsuitable for experimental work. The soil was considered fairly even in character and typical of much of the land now being opened up on the West Coast.

Koppio, May 15.

(Average annual rainfall, 22·40 in.)

PRESENT.—Messrs. J. Newell (chair), T. Brennand, H. Thompson, G. Miller, M. Howard, C. Barraud, W. Jericho, G. B. and T. R. Gardner (Hon. Sec.), and one visitor.

GRADING SEED WHEAT.—Following on the reading of an extract by the Hon. Secretary on "Seed Wheat," considerable discussion took place. Members were of the opinion that if farmers paid more attention to selecting and grading their seed, much better crops would result. Mr. Howard had had good results from drilling in super., and then broadcasting the seed. Mr. Newell thought that if the super. could be more evenly distributed over the whole of the ground the return would probably be better,

Mangalo, April 19.

(Average annual rainfall, 16½ in.)

PRESENT.—Messrs. A. G. Burton (chair), M. Burton, J. Busch, J. Deer, B. McMartin, W. E. Waters, J. Mieglich, Stienke, and four visitors.

SEEDING.—In a paper on this subject Mr. J. O. Busch said land should be worked to a good tilth before the seed was drilled in. Fallow should be worked back with a light cultivating plough. Late varieties of wheat, such as Marshall's No. 3 and Yandilla King, could be safely sown in this district as well as Federation, Walker's Early, Gluyas, and Carmichael's Eclipse. From 48lbs. to 60lbs. of seed, with from 40lbs. to 80lbs. of super. per acre, was recommended. Mr. Waters thought earlier wheats which did not stool well should be sown at the rate of about 60lbs. to the acre, with from 90lbs. to 112lbs. of super. Mr. J. W. Deer thought it inadvisable to plough to a depth greater than 4 in. Ground which had been left in a rough state for three or four weeks, and cultivated before drilling, returned better results than land drilled directly after the plough. Mr. M. Burton advised pickling seed six weeks before sowing. Mr. Waters said pickling should be omitted wherever possible. Algerian and Cape oats, he thought, did not require this treatment, but white and brown oats always required it. After further discussion on the value of pickling, members considered the relative advantages of different depths of fallowing. Mr. Busch thought deep ploughing most profitable in the heavier land, shallower working answering in the lighter soil. Members generally agreed that it was advisable to fallow new land wherever possible.

Miltalie, April 19.

(Average annual rainfall, 14½ in.)

PRESENT.—Messrs. J. S. Jacobs (chair), J. P., J. W., and E. Story, H. Brine, W. G. Smith, A. M., M. H., and T. A. Wilson (Hon. Sec.), and three visitors.

FARMERS DIFFICULTIES.—Mr. J. P. Story read a paper, in which he said—"A good many farmers bought farms when land was dear, and now that land values have gone down they have to pay a high rent and a big interest. With living expenses included it takes a man all his time to make ends meet. The question is—how is he going to do it? I think we will have to put in less wheat, and put it in better. One acre of fallow is worth two acres of stubble land at any time. Seed and super. are not going to grow a payable crop unless the land is properly worked. I also think we sow our wheat too thickly and do not give it a chance to stool. Three bushels to five acres is quite sufficient seed to sow. We may have to sow a little thicker on account of the present methods of threshing. Wheat for seed ought not to be threshed any more than one can avoid." The writer then said that the large grains were damaged in harvesting, winnowing, grading, and pickling more easily than the small ones, and he therefore doubted the wisdom of grading out the small stuff and sowing only the larger seed. Ten-bushel crops did not pay in this district at the present time, and it was a great mistake to put in large areas at first and to lay out too much money in the purchase of the latest machinery. Members generally agreed with the views expressed in the paper. When the land was cleared of shoots it needed to be fallowed, and the farmer was well advised to keep sheep. The present system of getting a large acreage under crop, however, was the best to follow on new land, which, being free of weeds, would require less working; 45lbs. to the acre was the rate of seeding generally favored.

Shannon, May 17.

PRESENT.—Messrs. W. Proctor (chair), H. Roediger, Cronin, H. Proctor, Smith, Carey, Ryan, Havelberg, Smith, Gordon, Cronin, and J. J. Cronin (Hon. Sec.).

THE AGRICULTURAL BUREAU.—The Hon. Secretary contributed a paper, in which he urged the necessity for greater interest in the local Branch. He stated that since its inauguration a great deal of practical good had been done in the district, and it would be a matter of extreme regret if the Branch were allowed to die out on account of the apathy of producers. There were numbers of matters of local interest that could occupy the attention of this institution, and he urged members to attend meetings in the future more regularly. It was unanimously resolved by members that they should make an effort to arouse greater interest in the work of the Branch.

Utera Plains, April 19.

(Average annual rainfall, 14in.)

PRESENT.—Messrs. Sinclair (chair), A. Venning, J. and M. Abrook, W. Hier, G. and H. Barber, M. Hunt, T. and G. Hornhardt, A. Ramsay (Hon. Sec.), and three visitors.

FALLOWING.—This subject was dealt with in a paper by the Hon. Secretary. Land intended for fallow, he said, should be worked lightly soon after the crop was taken off it. This would ensure a good germination of the seeds of weeds and assist in the retention of moisture, and the soil would keep in good condition much longer for ploughing. He preferred ploughing to a depth of 5in. or 6in., but the ground should not be turned up in too rough a condition. Where there was likely to be trouble in this way it could be worked up to a depth of 2in. or 3in. with a twin plough or scarifier, but this should be followed by a deeper ploughing. It would be found that crops drawing moisture from well down in the soil would maintain a steady and regular growth, and stand dry weather much better than those which depended on surface moisture. Therefore it was essential to allow the moisture to enter well into the soil by ploughing to a good depth. In the latter case, although the crops might come on with a quick growth in the event of a good fall of rain, there was more likelihood of their being affected by rust, frosts, and hot winds. The ploughing should be crossed with the scarifier, two or three harrowings following this implement. If the fallow then carried sufficient weeds to provide feed, sheep could with advantage be put on it. Members believed that in the near future all crops would be put on fallow. They did not think it necessary to plough to the depth recommended in the paper. Where there was a tendency to drift, the land should be left as rough as possible.

Yabmana, April 19.

(Average annual rainfall, — in.)

PRESENT.—Messrs. J. N. McCallum (chair), H. R. and A. McCallum, J. F., J. G., and A. Robertson, E. Frost, F. A. Bienke, A. Bienke, J. G. Pengeley, F. G. Strothers, F. W. Schuman, G. W. Storey, M. K. Frost (Hon. Sec.), and one visitor.

FALLOWING.—Mr. A. McCallum, in a paper on this subject, said it was generally admitted that fallow yielded better returns than newly ploughed land. Fallowing should be commenced immediately after seeding, to allow the land to take in as much of the winter rains as possible. The depth of ploughing should be determined by the nature of the soil. Three inches was deep enough for light sandy land, 4in. or more being necessary for rich heavy soil. On no account, however, should clay be turned up. The mould boards of the plough should be set to cover as many weeds as possible. After the first rain in September the fallow should be gone over with a heavy set of harrows to bring the surface to a fine tilth. This would give the weeds a good start, and the cultivator should be put on as soon as the weather settled. It was advisable to again work the land after a summer rain. Mr. Robertson thought it better not to bring the soil to a fine tilth until just before seeding; it should be left open. Mr. F. A. Bienke agreed with the writer of the paper. Mr. Schuman would leave the land open until just before harvest, when he would scarify it fairly deep. The Chairman favored working the land fine. The roller should be used to secure the burial of the seed to a uniform depth.

Yadnarie, April 19.

(Average annual rainfall, 14½in.)

PRESENT.—Messrs. W. L. Brown (chair), C. G. A., and F. W. Dreckow, J. A. and E. C. Kruger, F. W. Joricho, C. B. Schubert, A. Spriggs, F. H. Stubing, R. B. Deer, L. H. Marston, G. B. Kobelt, B. B. Crosby, S. H. Pearce, A. Priess, T. G. Fitzgerald, J. J. Deer (Hon. Sec.), and seven visitors.

FARM HORSES.—In a paper on this subject Mr. F. W. Dreckow stated that horses bred for farm work should not be of the heavy draught standard. These were too slow and clumsy and more expensive to feed, and generally required more attention than the medium draught. To breed the latter it was not necessary to own an expensive stud, and he advised, when choosing a stallion, the selection of a horse that showed markedly those characteristics which were not present in the mare. For instance, if the mare were tall and light, a short nuggety stallion should be chosen. The most suitable class of stallion for farm work was the Suffolk Punch. This was a very active and spirited horse and did not carry too much hair. Mares should not be used for breeding until

they reach an age of five years, and if the animal were in a fat condition it was advisable to work it up to within three days of foaling. It should receive a little suitable feed whilst the foal was young, and a low manger should be used in order that the foal might be encouraged to eat. When it reached an age of six months it should be weaned, being left with other horses and the mother being taken out of sight and hearing. The young animal should be well looked after until it was three years old, but more particularly until it reached the age of 12 months. Colts should not be castrated until two years of age. For stable accommodation he recommended the use of straw-roofed buildings, with a small yard in front, which would give the animals freedom during the night. Horses should always be watered before they were fed, and rock salt should be kept in the manger. With sheafed hay there was a great deal of waste, and it would be found that the horses would soon sicken when fed on loose hay. Careful attention should be given to the animals' shoulders and to the collar, thus obviating trouble with sores. Members generally agreed that Clydesdales were the more suitable horses. They stood more work, were better pullers, and moved quickly. Under ordinary circumstances they would geld colts before they were two years old. Mr. R. B. Deer thought it advisable to shut foals up when weaning them, but the majority of members thought it better to shut up the mare and allow the foal to run with other horses. Some members favored iron-roofed stables. For one reason they provided a catchment for water. Horses should be allowed as much food as they would eat, but when fed on rich fodder should be given plenty of water.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Berri, May 17.

PRESENT.—Messrs. S. Phillips (chair), S. L. Stearne, W. B. Penyfield, T. L. Hughes, E. Day, A. R. Stahling, R. Koska, J. Fiedler, W. Fiedler, A. Jarvis, J. McGilton, B. A. Arnlt, A. Wishart, W. R. Lewis (Hon. Sec.), and two visitors.

AFORRESTATION.—An interesting discussion followed the reading of a paper on this subject by the Hon. Secretary. General regret was expressed that a great deal of timber was annually wasted by the felling of trees that were too young to provide good timber.

Borrika, May 17.

PRESENT.—Messrs. E. H. Huxtable (chair), R. Collins, N. Collins, J. Waters, sen. and jun., L. G. Huxtable, J. Woods, J. L. Sanderecock, W. Mayfield, T. Wright, A. E. Scary, A. E. Hart, J. H. Gray, G. Bowden, N. V. Brown, G. L. Bonython, R. J. Stephens, H. J. Stephens, J. E. Coombe, H. S. Green, F. J. Weber, P. J. Marker, C. W. Traeger (Hon. Sec.), and four visitors.

FRUIT-GROWING.—Under the heading of "Fruit-Growing for Home Purposes," Mr. G. L. Bonython read the following paper:—"All settlers should plant a few trees for their own requirements. Select a sheltered place, if possible near the water supply, where there is deep, sandy soil, as this will hold the moisture better, and will not require nearly so much water as the hard soil. Grub all stumps and plough the ground as deep as possible. Dig holes 3ft. across and 2ft. deep, put in some stable manure or bonedust, and mix it well with the soil. Plant the trees 16ft. to 20ft. apart each way. If put 16ft. by 16ft. apart, 169 trees will plant an acre; 20ft. by 20ft. will require 100 trees. Prune all young trees with a sharp knife. If they have straight rods, cut them to a bud about 18in. from the ground. If they have formed heads, cut back all the centre limbs, leaving three or four outside limbs for main arms. Cut them to a bud facing outward, 8in. or 10in. from last year's pruning. If the roots are not even, plant them with the main

roots to the windy side. Very few seedlings turn out any good. It is much better to procure from a reliable nurseryman some worked trees that are known to be good varieties and good bearers." The writer then gave a comprehensive list of different varieties of various fruits which he considered suitable for the district.

Coonalpyn, March 23.

(Average annual rainfall, 17½ in.)

PRESENT.—Messrs. Wall (chair), Williams, Venning, Gurner, Bone, Venning, Watson, Cronin, and J. Hill (Hon. Sec.).

BOOK-KEEPING.—A short paper on this subject was read by Mr. E. E. Williams. The farmer's books, he said, should contain a record of all transactions of every department of the farm work, and they should enable him to determine accurately which particular branches were paying and those that were not. It would be necessary to debit to the particular branch which used the produce such items as hay, oats, wheat, &c., whether these were grown on the farm or purchased outright. For instance, a farmer began the year with a stack of hay, 100 bags of oats or wheat, and a quantity of grain ordinarily regarded as waste, but which was really of value as fowl or pig feed. The value of this should be noted, and the quantities used for horse feed, poultry feed, pig feed, &c., should be charged to the proper accounts. Horse feed might be debited to "farm expenses" but the other amounts should be debited to "dairy account," or such other branch, as the case might be. The records of produce from these sources should be kept and duly credited to the respective accounts. Thus one could see on which side the balance lay. A good discussion followed the reading of the paper.

Forster, May 17.

(Average annual rainfall, 10 in. to 11 in.)

PRESENT.—Messrs. C. Hayman (chair), J. G. and R. Whitfield, T. J., and W. Scarle, E. Towill, C. P. Payne, T. and G. Retallack, W. Johns, P. Purdie, W. J. Sears (Hon. Sec.), and three visitors.

PREPARATIONS FOR SEEDING.—Mr. G. Retallack read a paper on this subject. In the first place, he said, it was necessary to grade and pickle the seed. He believed in the floor method of pickling, and had found a large shallow box a splendid means of carrying this out. He used 11b. of bluestone and 4galls. of water for three bags of wheat. The harness should then be repaired, cleaned, and oiled. Implements should likewise receive attention, and the horses should be given at least one week's stable feeding before being put to work. The preparation of the seed bed should commence after the first rain in March. Fallow should be cultivated shallow and then harrowed, the seed being drilled in in April or May, the harrows following the drill immediately. Old land should be ploughed up in February or March if it was sufficiently moist, and worked and sown during May. The quantity of super. depended on the class of land; 50lbs. would be found ample for new land or clay flats, but for light sand and old country 80lbs. would be better. The poorer the quality of the land the lighter should be the seeding. Of Dart's Imperial, Marshall's No. 3, Yandilla King, and Silver King he would sow from 40lbs. in the early part of the seeding up to 45lbs. later; and of Gluyas, Purple Straw, and Newmann's he would sow 50lbs. to 60lbs. to the acre. Eight hours work per day was quite enough for the horses, and they should be groomed every morning and stabled under clean conditions. One and a half hours was necessary for their dinner, and he advised three meals of 10lbs. of hay chaff and 5lbs. of oats per day, with long hay the last thing at night, the fodder being placed in boxes in the stable. Water should be provided three or four times a day. Members agreed with the ideas expressed by the writer of the paper.

Hooper, May 17.

(Average annual rainfall, 14 in. to 15 in.)

PRESENT.—Messrs. J. R. Beck (chair), W. A. Pearce, A. Hood, T. Nicolle, H. Nicolle, R. J. Chenoweth, B. Chenoweth, W. J. Sweetman, J. Boyce, C. S. Hall (Hon. Sec.), and two visitors.

FALLOWING.—Mr. J. Boyce contributed the following paper:—"In districts with a low average rainfall the most important point with which the farmer has to deal is the

conservation of soil moisture. Proper methods of cultivation will enable any farmer to make the most use of a rainfall such as we have here. I consider it best to fallow as early as possible, say in June or July. The man who ploughs in September cannot hope to obtain the best results. To have good fallow in dry districts one must allow all the winter rains to get into the land. The moisture will then penetrate well into the subsoil, and can be kept there. Ploughing for fallow is without a doubt the most important of all tillage operations. It should be done in a careful manner, for no good work done later can make up for bad ploughing. In districts such as this 5in. to 6in. is not too deep to plough for fallow, and this practice will conserve more moisture than lighter working. If the soil has been ploughed when in a good condition, it can with advantage be left in the rough state for a few weeks. The object of working in the early season is to keep a fine mulch on the surface, and so conserve the moisture. The harrows should be kept going after every rain, to hinder capillarity and evaporation. As the result of good fallow the ground at seeding time should be moist enough to germinate the seed, even if no rain has fallen for a month previously. Providing the seed is sown in the moist soil beneath the loose, dry mulch on top, the germination should be good. It is always a good plan to harrow after the drill, especially after a rain. Farmers should sow the best clean seed, and have it graded. If the pickle is made too strong a poor germination will result. We always use a quarter of a pound of bluestone with 3galls. of water to one bag, and have found it a success. I believe in the old method of pickling on the floor, turning the seed with a wooden shovel, which is not so likely to crack the seed." In discussing the subject, members agreed that it was advisable to commence fallowing as early as possible, but it was not necessary to plough to the depth recommended by Mr. Boyce, especially if the land had a limestone rubble subsoil.

Lameroo, March 29.

(Average annual rainfall, 16in.)

PRESENT.—MESSRS. E. J. Trowbridge (chair), Wray, Needs, Jericho, Lehman, Marshall, Ross, Lockie, J. F. Jericho, Blum, Cameron, C. R. Eime, A. Kummich, Carter, Koch (Hon. Sec.), and several visitors.

1912 HARVEST.—The meeting was devoted to the consideration of the methods of seeding conditions and results of the 1912 season. The Chairman reported that he cultivated during March 111 acres which had been cropped the previous year, and sowed 1bush. of oats with 50lbs. of super. to the acre. He fed off the crop with sheep and then cut 90 tons of hay from the plot. One hundred and fifty acres were skim ploughed and sown during the second week in April with 30lbs. of wheat and from 75lbs. to 90lbs. of super. per acre. The wheat was fed off with sheep until September 13th: the yield was 11bush. per acre. Grass land ploughed between April and June had returned results as follows:—85 acres sown in May with 1bush. Walker's Wonder and 75lbs. super. returned 8bush. per acre; 90 acres sown in May with 1bush. Golden Drop and 75lbs. super. returned 15bush. per acre; 30 acres sown in May with 1bush. Gluyas and 75lbs. super. returned 14bush. per acre; 100 acres sown after rain with 1bush. Walker's Wonder and 75lbs. of super. returned 11bush. per acre. An area of 110 acres, consisting partly of fallow and partly of grass land, was sown during the second and third weeks of July with 1bush. of seed and 75lbs. of super.: the crop averaged 9bush. With the exception of 110 acres the whole of the area cropped was harrowed, the general average return being 12bush. Mr. Marshall commenced drilling early in May: 77½ acres were sown with 45lbs. of Yandilla King and 50lbs. of super. per acre. The crop was badly cut by the frost, but the return averaged 7bush. of grain of splendid sample. Following this, 41½ acres were sown with 1bush. of Baroota Wonder and 70lbs. of super.: the average yield was 12bush. of grain and a portion cut for hay returned 1 ton to the acre. The crop was short and affected by the frosts. On a sandy rise he then put in 22 acres with 45lbs. Budds and 50lbs. of super., the average return being 6bush. per acre. Five acres of first-class land were sown with 45lbs. of Bulldog wheat and 70lbs. of super. per acre, but the crop was a complete failure. On good flat land 98 acres of Baroota Wonder, sown at the rate of 1bush. seed and 70lbs. of manure, returned an average of 11bush. The poorest looking crop consisted of 50 acres sown with 45lbs. of Federation and 50lbs. super. per acre, but the yield averaged 10bush. Linseed sown in July returned a payable crop, and half an acre drilled with early peas and lucerne mixed, with super. on well-cultivated land, did well. Mangolds provided the best return. He sowed the seed broadcast on land which had been well worked with a tine cultivator and covered it with stable manure. The crop averaged 10 tons to the acre of splendid mangolds, which were being used for fattening sheep and feeding cows and fowls. Mr. A. J. A. Koch put in 240

acres, consisting principally of stubble land, which was worked and drilled in a dry condition with 45lbs. of wheat and 60lbs. of super. to the acre. The crop was harrowed after rain, but was badly blighted by hot winds, the result being 9bush. to the acre. Oats were sown on stubble cultivated and drilled when dry at the rate of 30lbs. of seed and 60lbs. of manure per acre. Sheep were put on until September 1st, and after a month again put on between October 1st and 6th. Subsequently the yield was equal to 9bush. per acre. Land fallowed in August, 1911, harrowed twice, and then cultivated and harrowed before drilling, was sown with 45lbs. wheat and 90lbs. super, after which it was again harrowed. This was cut for hay, and returned about 1 ton to the acre. An area fallowed in September, 1911, harrowed only, then cultivated before and harrowed after drilling with Gluyas on June 14th, returned 15bush. per acre. Mr. Wm. Needs sowed Walker's Wonder on well-worked fallow with 55lbs. of manure to the acre, and secured a return of 10bush. Under similar conditions Yandilla King returned an equal result. Fallow land, not worked, sown with Federation wheat and 55lbs. of manure averaged 13bush. Federation on land ploughed at seed time, and dressed with 50lbs. of super., returned 13bush. per acre, whilst an area cultivated twice at seed time, with an equal manurial dressing, yielded 16bush. per acre. Mr. E. T. Wray dry sowed oats in April on 31 acres, which had been ploughed dry, and secured an average return of 16bush. At the beginning of May he sowed 152 acres of stubble with Federation principally and a small part with Gluyas. The land was cultivated, drilled, and harrowed dry, and the seed was sown unpickled; the average return was 12bush. to the acre. The Gluyas was slightly affected with smut, but the Federation was quite free of it. Toward the end of May 400 acres of fallow were sown, half with unpickled Yandilla King and half with Budd's Early, previously pickled. The former was badly smutted, but the latter was unaffected. The average return was 15bush. per acre. The land was fallowed in August and was rather dry, the crop under notice being the third. Sixty acres of grass land, ploughed when damp and sown with Yandilla King and Budd's Early, both pickled, averaged 12bush. to the acre. Sixty-eight acres fallowed in July and skim ploughed, drilled, and harrowed, and sown with Florence and Gluyas, was slightly affected with takeall. The greater part was cut for hay and averaged 1 ton to the acre. A small portion left for grain yielded well, and promised an average of 18bush. per acre had the whole area been stripped. Mr. C. R. Eime put in 270 acres of dry fallowed stubble. The crop was badly affected with takeall, with the exception of 60 acres which had been harrowed during the summer after a rain, and which was only slightly attacked. Forty-five pounds of Yandilla King was sown, with $\frac{1}{2}$ wt. super., and returned 10bush. to the acre. One bushel of Walker's Wonder and 75lbs. of super. per acre yielded 12bush. Tregal's was sown at the rate of $\frac{1}{2}$ bush. per acre, with 75lbs. of super., and yielded 17bush. This was a splendid wheat with a nice plump grain, which stood well and was easy to thresh. Fifty acres cut for hay averaged a return of about 1 ton to the acre. Seventy acres of Walker's Wonder, drilled on stubble ground, the second year's crop, averaged 12bush. per acre. It was ploughed in March, harrowed, drilled in with 60lbs. of super and 45lbs. of seed, and then harrowed again. Twenty-seven acres of hay-stubble, which was ploughed early and then drilled with 65lbs. of King's Early and 70lbs. super. per acre, was cut for hay and yielded well. This was the first time he had sown King's Early for hay, and he thought it was the best hay he had grown. His last sowing—Gluyas—drilled in the first fortnight in July, yielded 17bush. per acre: 180lbs. of super. and 65lbs. of seed per acre were sown. About half the piece was grass land, ploughed up, drilled, and harrowed, and the other was fallow. It was reaped in the one piece, but there was no apparent difference between the crop on the differently treated land.

Lameroo, April 19.

(Average annual rainfall, 16in.)

Messrs. E. J. Trowbridge (chair), Leckie, Kain, F. W. Eime, O'Connor, Lehman, Jericho, K. and J. Cameron, Wray, Gibbon, Ross, S. G. Trowbridge, Marshall, R. B. Koch, Mead, Batten, A. J. A. Koch (Hon. Sec.), and several visitors.

HARVESTER v. STRIPPER.—In a paper on this subject Mr. F. W. Eime said the harvester was not a suitable machine for use in this district. Owing to the sandy nature of the soil, a regular suitable speed could not be maintained, with the result that the chaff was not all cleaned from the wheat. The presence of stumps made the work very heavy on the machinery. No difference in the total weight of the crop when ready for market should be noticeable, whether this machine or the stripper and winnower were used, provided the crop was in fit condition for reaping, but if it were gathered when damp, grain would

be lost in the heads by the stripper. Wheat for seed should not be stripped in hot weather, as the grain was damaged to a greater extent than if it were damp-stripped. Under present conditions the stripper and winnower provided the best f.a.q. sample of grain, but if the harvester were worked properly, as good, if not a better, sample should be received. Where there was mallee in the crop the stripper should be used. The rubbish would then dry in the heap and could be blown off by the winnower in the chaff. Continuing, the paper read—"Some 20 years ago, when the Murray Flats, which consisted of a lot of mallee country, were opened, mallee used to be troublesome, but as the stripper was used in these days there was no trouble in getting a good marketable sample. When the crops were short in bad seasons, and the stripper had to go low down for the few heads, more mallee than wheat would be secured, but after a few days the mallee would dry, and when put over the winnower a good clean sample was secured. I believe that the harvester will have to give place to the stripper for the present. I would advise any farmer who has much mallee to contend with to go in for strippers. This will pay him, and it will also be better for our local wheatbuyers. I am quite sure that they are suffering a loss through wheat gathered with the harvester this year." Dealing with the same question, from the standpoint of the miller, Mr. A. Townsend said—"One of the most serious problems which faces the miller to-day is to maintain the quality of his milling product against the so-called improved methods of harvesting. To make myself clear, it will be necessary to give a short digest of the methods by which the grain is prepared for milling. The wheat, when received from the farmer, first goes through a smutter, which takes out the cocky chaff, sticks, leaves, smut balls, &c.; it then goes through a scourer, which takes off all the germ and polishes the grain; the wheat is then carried along a trough slightly damped and deposited in a bin for 12 hours. This is to make the skin tough so that the inside can be more readily cleaned from the shell or bran, and leave a purer and better-colored flour. The fact of the wheat being damped and left overnight will show that it is necessary to have the whole of the day's grinding the same to get a uniform sample of flour. It will at once be seen that if a miller gets a load of wheat which has been taken off with a harvester and containing ripe and unripe grain, and he has to use it straight away, his whole system of preparing his wheat for the rolls is useless, because the unripe grain will spoil the whole lot. If he puts it in the stack it has a tendency to breed vermin, and very often goes black, which immediately spoils the flour. Before the harvester came into use there was none of these difficulties to contend with, because only ripe wheat was stripped, or that which was not quite ripe matured in the heap before being winnowed. If the stripper is followed by a motor winnower the sample is practically the same as from the harvester. There may not be as much rubbish in the bag, but the unripe grain is there. Unfortunately the farmers of Australia, although they have proved that they can grow and prepare the best wheat in the world, are fast spoiling their markets in the outside world by this quick and dirty method of harvesting. Unless wheat is harvested in a manner to provide a cleaner sample in the near future, it will be suddenly realised that Australian wheat has lost its present status in the home markets. Take your own little town as an illustration. A farmer comes in with a load of wheat. He is known by the agents to be a farmer in every sense of the word, and they sometimes spring the price to get his wheat. Another farmer pulls in; he is also known to the agents, to their sorrow, and they are always very busy when he is about. He has lost the confidence of the agents. So surely will the farmers of Australia forfeit the confidence of the home buyers if they are not careful. When the directors of one wheat-buying firm, a few weeks ago, were in this district they seemed proud of the fact that they were doing a big thing in cleaning and grading wheat before it was shipped. It appealed to me at the time that if it were necessary to do this, which I am sorry to say it is, then the harvester is a failure compared with the stripper and winnower. I have not dealt with the farmer's side of the question. He will argue that the harvester is more expeditious, and point out various other ways in which he is the gainer; but he must not forget that the merchant and the miller are the media between him and the consumer, and if he allows his product to deteriorate he is bound to be the loser in the end. In conclusion, I would say that I believe in machinery which reduces manual labor, as is done by the harvester, but it rests with the farmers to see that the capabilities of this machine are not abused."

Loxton, May 21.

(Average annual rainfall, 12in. to 13in.)

PRESENT.—Messrs. C. Swinburne (chair), A. J. Lowe, B. F. Beer, C. T. Durlin, F. Heitmann, G. Tucker, A. A. Petch, A. J. Durdin (Hon. Sec.), and three visitors,

SELF-SOWN CROPS.—Mention was made of a number of self-sown crops which were appearing in the district. It was thought that under favorable circumstances several of these would average from 7bush. to 10bush. per acre. In some cases they were standing from 3ft. to 4ft. in height, and were flowering, which was a very unusual thing for this time of the year. There was a probability of some of them being cut for hay, although some members recommended feeding them down.

Monarto South, May 17.

(Average annual rainfall, 14in. to 15in.)

PRESENT.—Messrs. G. Patterson (chair), R. E. Anders, A. P. Braendler, J. and H. Frahn, G. Gogol, J. E. and R. Hartmann, A. Harper, G. and R. Pach, A. Schenscher, J. Daly, C. F. Altmann (Hon. Sec.), and four visitors.

TAILING LAMBS.—Mr. J. Frahn read a short paper on this subject. It was necessary, he said, when lambs were to be tailed to quietly drive the sheep into a small yard and then allow them to cool. The lamb should be held with one fore and one hind leg in each hand on a rail about 3ft. high. The tail should be cut off short, and in the case of a ram lamb the top of the purse also should be cut off, the testicles being grasped and pulled out with the teeth. A small quantity of kerosine should then be poured into the purse. The animals should then be put down gently and kept away from the sheep. Tailing should be done when the lambs were two or three weeks old, a warm day being selected for the operation. The knife was preferable to the searing iron, and it was most important that the lambs should not be unduly worried for a week after treatment. Members agreed with the ideas of the writer of the paper. Although the lambs were not weakened by the loss of blood when the searing iron was used, the wound took much longer to heal than when the knife was used.

Parrakie, April 26.

PRESENT.—Messrs. F. J. Dayman (chair), H. Diener, C. Heinzel, T. Lewis, W. Threadgold, F. W. Randall, A. F. Dayman, J. G. Temby, J. O'Hara, A. C. Hameister (Hon. Sec.), and four visitors.

IRRIGATION.—In a paper on this subject Mr. H. Diener stated that a great deal more advantage could be taken of the plentiful supply of water in this district than was the case at present. Fruit and vegetables would be found to grow extremely well if supplied with small quantities of water during the summer months. He had sown a small area of lucerne last winter, which had been cut every three weeks in summer. It had grown to about 18in. or 2ft. in height between the cuttings. By having a tank on a stand not less than 10ft. in height, and running a pipe bearing several taps for about 100ft. from the tank, with the aid of a hose and sprinkler it was possible to water a fair-sized plot of ground. The best time to water was in the evening, when the loss by evaporation was less. Frequent loosening of the soil was necessary, and it was a good plan to top dress it with stable manure. The windmill was the most economic means of pumping, and he expressed the opinion that the majority of those in the district who were growing fruit and vegetables under irrigation were using too much water and neglecting to work the ground sufficiently. Radishes, tomatoes, turnips, carrots, cabbages, peas, beans, and onions would all be found to do well if properly cared for. Members generally agreed with the remarks of the writer of the paper, and mentioned that there was an abundance of water in the district to be secured at a very low cost.

OATS.—Mr. A. F. Dayman, in a short paper, expressed the view that larger areas of land in this district could be sown with oats. Whilst a little more work was entailed in harvesting it would be found that a good crop of this cereal could be grown on land that would not produce good crops of wheat. In addition, the stubble would provide a good burn, and this was a great consideration. Wheat would be found to do better for three or four years after a crop of oats. While horses did not take to oaten hay readily, when chaffed they would eat it. There was a danger, however, in sowing too large an area, as the crop was likely to shake out. In discussing the subject, Mr. Diener said he would sow at least three crops of wheat on the land before putting in oats. Mr. J. G. Temby thought this a very payable crop, especially on account of the good stubble burn and

the way in which it discouraged takeall. Mr. F. J. Dayman said he had had difficulty with the horses eating the heads from the sheaves of oaten hay, but wheaten hay gave no trouble in this regard. He preferred King's Early wheat for hay.

Pinnaroo, May 17.

(Average annual rainfall, 16·74in.)

PRESENT.—MRS. B. L. Harfield (chair), M. Beckwith, F. G. Bonnin, H. E. Dibben, F. H., P. J., and R. Edwards, H. G. Fewings, L. M. Ferguson, H. C. Hill, W. A. and M. Kelly, H. Ledger, C. Lee, J. Letheby, B. H. Nash, C. A. E. Schiller, J. Scales, W. and H. Venning, P. H. Jones (Hon. Sec.), and four visitors.

SHEEP ON THE FARM.—A paper was read by Mr. W. A. Kelly. The writer pointed out that weeds were spreading throughout the district, and unless some means were taken to keep them under, clean crops would soon become a rarity. Sheep were the only effective way of dealing with this pest, as they ate what other stock would not, and though they perhaps did not fatten, the wool was growing. Without these animals farmers were often compelled to cultivate to keep weeds in check. There was a direct profit from the wool and lambs, the latter in a good season paying for the first cost of the sheep. Farmers should be careful not to overstock, and arrange for pasturing on small areas at a time. Mr. P. J. Edwards had noticed that the Bathurst bur was making its appearance in the district. The time had passed when farmers could depend entirely upon wheat-growing. The one great trouble and drawback to the keeping of sheep was the "straying dog," and until such time as something was done to minimise this nuisance, farmers could not profitably attempt mixed farming in this district. Mr. H. Ledger remarked that unless sheep could be kept, farming would not pay. In many instances weeds were numerous, and their destruction was becoming a serious problem. Sheep proved the only way out of the difficulty. He advocated a dog-proof fence to deal with that pest. It would pay owners for their outlay. The trouble was not so much with the domestic dog as with the wild animal. Mr. F. H. Edwards agreed that sheep were a necessity on the farm. If the Dog Act was more severely administered it would to a large extent lessen the troubles. He did not favor fencing against dogs on account of the heavy expense. Mr. Schiller said it was a matter of utter impossibility for farmers near the unsurveyed country to keep sheep in consequence of the raids by wild dogs. He considered the hundred should be dog-proof fenced. Mr. W. Venning advocated a dog-proof fence around each holding. He knew of instances when it had been done, and it was not quite so expensive or difficult an undertaking as most members thought.

Tintinara, April 26.

(Average annual rainfall, 19in.)

PRESENT.—MRS. R. J. Gully (chair), Scott (2), Bell (3), C. M. Ives, Bainger (2), Henderson (2), Donaldson, Kennedy, Stead (2), Bert Taylor, C. P. Hodge, M. F. Hodge (Hon. Sec.), and eight visitors.

POULTRY INDUSTRY.—A lecture on this subject was delivered by the Government Poultry Expert (Mr. D. F. Laurie), who stated that this district was eminently suited to poultry-raising. Housing, breeding, and feeding were matters to which they should pay careful attention. The results of the egg-laying competitions carried out by the Government were touched upon, and reference was made to the transference of the stations to Parafield. Intending poultry-breeders were advised to commence with a good laying strain, and to breed from hens two years of age. The average price of eggs in 1906 in this State was 8½d. per dozen; this year it was 1s. 1d. per dozen in Adelaide. The value of the export of eggs and poultry was £150,000 per annum, and if the inter-State market failed to take the whole of South Australia's surplus there was a market in England and the Continent to fall back on. Autumn was the natural moulting time, as most chickens were hatched in the spring. Hatching in March and April was advised; the pullets would then lay in September, at the end of which month hatching should cease. Confined fowls could be fed on grain only, plump oats making a good feed; barley should only be fed occasionally when the birds were being fattened. The majority of grains were deficient in mineral salts, which could be partly supplied by lucerne. Clean water, grit, and charcoal were essentials. Water vessels should be kept thoroughly clean, the best disinfectant being bluestone used at the rate of 1oz. to 1gall. of water. Eggs should be marketed in proper boxes, and those that were dirty should not be sent.

Walkerie, May 19.

(Average annual rainfall, 8'8in.)

PRESENT.—Messrs. F. G. Rogers (chair), J. Jones, A. Lewis, S. Modistach, E. J. Burton, C. Promnitz, J. J. Odgers (Hon. Sec.).

ORCHARD PESTS.—A discussion took place relative to various pests which were infecting orchards. Mr. Jones mentioned two lemon trees which a few seasons ago showed signs of having been attacked on the leaves by some insect which he was unable to discover. On making an inspection of the trees at night he found them thickly covered with beetles, which were eating the leaves. The insects made a practice of feeding at night and burrowed in the sand at the foot of the trees in the day. He spread a cloth round the trees, and on to this he shook a large number of the beetles. Subsequently he put a wire netting fence around the trees and allowed fowls to run inside. These completely cleared out the pest, and he had not been troubled with them since.

Wilkawatt, May 17.

(Average annual rainfall, 16in. to 17in.)

PRESENT.—Messrs. D. F. Bowman (chair), W. J. and D. Bowman, jun., T. Sorrell, sen., E. W. and H. H. Brooker, A. J. McAvaney, F. Spackman, W. R. and M. Neville, F. W. Altus, P. Maher, B. Tylor, W. J. Tylor (Hon. Sec.), and seven visitors.

WORKING NEW LAND.—In a paper on this subject, Mr. M. Neville said that in this district new land should be worked and drilled when in a wet condition. There was a general belief that this class of country could be worked as soon as the scrub was burnt, but unless rain fell it would be very dry. Dry working encouraged takeall, yet it was desirable to get as many ashes into the ground as possible, but he thought in the long run it was preferable to lose the ashes rather than do the work before rain. The share plough was the best implement, as while it entailed more labor in the way of stump-picking than the lighter implements, the running roots of the stumps were broken, and this left the latter much weaker in consequence. There was also a better chance of securing a running burn over the stubble. If the shoots were weaker and thinner it would be possible to get a better return from cultivating than from ploughing during the first year, but the return over a series of years was the main consideration. He thought that land cleaned with the cultivator settled down very much harder than that ploughed; consequently the working was much more difficult in the following season. The land could be cleared much more expeditiously with the share plough. In reply to a question as to whether cultivating the ashes when dry and ploughing after a rain would answer the purpose, Mr. Neville thought that whilst this might be done, ploughing wet was a better policy.

PICKLING WHEAT.—Mr. Neville had used formalin for pickling wheat for seed, and he advised sowing immediately after treatment, otherwise germination was interfered with. The Hon. Secretary read an article by Mr. A. E. V. Richardson, M.A., B.Sc., printed in the *Victorian Journal of Agriculture* under the heading "Wheat and its Cultivation," which stated that experiments in Victoria showed that seed pickled with formalin did not show any loss of germinating power when not sown immediately after treatment, but, on the contrary, gave more satisfactory results.

SCOTCH THISTLE.—Mr. Neville drew attention to the rapid growth and spread of the Scotch thistle in this district and urged members to do their utmost to keep it in check.

SOUTH AND HILLS DISTRICT.**Blackwood, May 19.**

(Average annual rainfall, 27in. to 29in.)

PRESENT.—Messrs. W. L. Summers (chair), Ashley, A. W. and A. A. Magarey, P. H. and D. Williams, Dall, Scherer, H. Sullivan, Sibley, Eglinton, Gamble, Hilfers, Carlos, Philips, Porter, C. G. Savage (Hon. Sec.), and two visitors.

STRAWBERRY CULTURE.—In a paper dealing with this subject Mr. Gamble said it was of utmost importance in growing strawberries to plant the right sorts in the right place.

The land should be broken up to a depth of between 1ft. and 15in., according to the depth of the clay subsoil. Rows should be 2ft. apart, with a distance of 1ft. between the plants in these. Planting was best done during June and July, and when the plants were well established the soil should be hoed with a flat hoe to a depth of about 1in., the top soil being kept in a loose condition during the summer. The Marguerite variety required new soil, with a good slope facing north to north-east, which would shelter the plants from the cold south-west winds which generally prevailed when this variety was in full bloom. The Marguerite bore one or two crops of flowers, but unless in a good sheltered position they did not set. The next earliest variety was the Paxton, which preferred a south to south-west aspect. The first flowers set well. Where the position was not of the best for early sorts, Royal Sovereign Paxton, or some other varieties which bloomed later might be tried. Although Melba promised to be one of the heaviest bearing varieties, he did not think it would do well here, on account of the dry, hot summers experienced. It should do well on the banks of the Sturt River. It would stand a heavy dressing of stable manure occasionally. Where the ground was of poor quality about 7cwt. or 8cwt. of bonedust per acre could be applied. Whilst the application of sulphur might be an effective remedy where mildew attacked the plants, when a hot summer was experienced a large percentage of the plants died, and with the digging of the land the sulphur was buried in the soil. Members, in discussing this paper, thought good results would be obtained by the addition of lime to the soil. The Secretary reported that although last summer was not the best for strawberry-growing, the Federation variety in the Experiment Orchard collection had grown and fruited far better than other varieties. The Chairman drew attention to the new strain of strawberries, viz., Ettersburg, which had been raised in California, and suggested that it would be well if some were imported for testing here. Members were generally of opinion that after the strawberry beds were planted, shallow working gave the best results. Stress was laid upon the necessity for selecting the new plants, in place of indiscriminate planting of all runners. A fairly lengthy discussion took place upon the point as to whether new land was essential for successful strawberry-growing. Members favored the new land, but brought forward no definite results regarding the planting of old soil.

Cherry Gardens, May 20.

(Average annual rainfall, 35.3in.)

PRESENT.—Messrs. H. Jacobs (chair), C. Ricks, J. Lewis, T. Jacobs, sen., G. Hicks (life members), S. W. Chapman, H. Lewis, A. Broadbent, T. Jacobs, jun., J. Tozer, and A. R. Stone (Hon. Sec.).

SHEDS, PIGSTIES, AND GATES.—The Hon. Secretary contributed a paper under the heading "Some Farmyard Conveniences." Suitable accommodation, providing due protection from the weather, should be afforded machinery, implements, &c. For the floors of pigsties he recommended first picking up the earth and then covering it with from 8in. to a foot of good concrete, consisting of metal sized stone, clean sand, and good lime in proportions to make a good strong mixture. This should then be rammed or rolled to a smooth surface, particular attention being given to the edges. On top of this a good thick coat of cement, in the proportion of two of clean sand to one of cement, should be placed, and finished off to a smooth surface. Gates should, wherever practicable, be substituted for slipp rails. They could be constructed on wet days, when outside work could not be done. Two good end pieces, consisting of split or sawn timber should be secured. The swinging end should be lighter than the butt. After sufficient mortices had been made for the reception of the crossbars, the whole could be braced together with ordinary fencing wire twisted between the rails. A coat of paint or tar would add considerably to the life of the structure. A better looking gate could be made of 4in. x 1½in. oregon placed between two uprights and bolted together, a piece being placed diagonally across to prevent sagging. A lengthy discussion followed. Mr. A. Broadbent thought concrete and cement floors too cold for pigs. Sunlight should be admitted to the sties; too much roofing would probably result in failure. Mr. Chapman thought that while the initial cost of iron gates was greater it would pay landholders to erect these

Forest Range, May 15.

(Average annual rainfall, 36in.)

PRESENT.—Messrs. J. Green (chair), W. McLaren, H. Schulz, E. Rowley, H. Sass, H. Waters, A. Green, F. Green, O. Pollard, F. Rowley, C. Dollman, R. Collins, E. J. Green (Hon. Sec.), and six visitors.

Co-OPERATION.—In a short paper on this subject Mr. Sass drew attention to the excellent results which had followed the co-operative system of marketing produce in France and Denmark. He urged producers to dismiss that spirit of distrust that sometimes existed, and expressed the hope that eventually all markets would be run on co-operative lines. Mr. Rowley agreed, and instanced the benefits which had accrued from the adoption of this system with the marketing of fruit in Barossa and other centres. Mr. Green thought raspberry growers could ensure a payable return for their produce if they effected a combination.

Hartley, May 14.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. B. Wunderaitz (chair), S. Pratt, S. Beavis, W. T. Richardson, W. Cross, T. Phillips, A. Wunderaitz, W. Bermingham, G. Hill, F. Burns, J. and J. M. Hudd, J. Stanton (Hon. Sec.), and one visitor.

FARMING SMALL AREAS.—In a paper on this subject Mr. H. H. Cross said that with farms covering areas ranging from 80 to 100 acres it was necessary for the landholder to exercise considerable care. Mixed farming was the best system to adopt; and, continuing, he said—"Six or eight cows should be kept in milk nearly all the year, and sufficient pigs to take the milk the cows produce. The best cows only should be kept, and after they have reached the age of seven or eight years they should be fattened for market. From 1907 to 1911 I have averaged from £45 to £50 from my six or seven cows. In recent years I have kept two breeding sows and find them very profitable; the last litters from the two sows realised £11. Anyone keeping two or more sows should also keep a boar; but he should be careful to see that he secures a good one. At least 200 head of fowls could be kept, and if looked after and attended to they should bring in £50 a year for eggs and £10 for young birds exported. In my opinion no breed is better than the old common barnyard fowl, both for producing eggs and fattening for market. Of the hundred acres no more than 50 should be used for cultivation at once, 20 acres of that area each year being fallow, thus leaving 30 for wheat and hay and 50 for grazing. Ten acres would be sufficient to cut for hay in any ordinary year, and that would feed all the stock used on the farm. The 20 acres of fallow, well worked, kept clean, and sown with a good class of wheat in such years as the last five or six, would produce at least £60, making a total return of £195 from the farm. No useless horses should be kept. Five would be sufficient to do all the work needed, one of these being a buggy horse. One great difficulty on a small farm is that it needs as much machinery to do the work as is required on a larger farm. In all cases great care should be taken of all machinery, and after using it should be cleaned, painted (if necessary), and put in the shed. Every farmer should keep up with his work, and in the 12 months find time to spend a fortnight's holiday after harvest, and also after seeding. He should read the *Journal of Agriculture* thoroughly, and not miss any reports that may be made by any of the experts." Members thought three horses sufficient to do the work on a farm of the area stated. The barnyard fowl was not profitable; the best laying strains only should be kept; £60 per annum was not sufficient return from 200 hens. If the constitution of the animal were good, a cow could, with profit, be kept until it reached the age of 10 or 12 years.

THE DEVELOPMENT OF AGRICULTURE.—An interesting paper was contributed by Mr. S. Beavis. After pointing out the utility and importance of agricultural education he touched on the question of the improvement of agricultural conditions concurrent with the advent of superphosphate. The wonderful development of wheat-growing was apparent from the fact that the first wheat grown in Australia, consisting of a crop of about 10 acres, was harvested in 1790. Attention should be given to the conservation of water for irrigation purposes, and such matters as united action in the destruction of noxious weeds and better systems of marketing wheat might occupy the attention of agriculturists. The value of experiments could not be too highly regarded.

Inman Valley, May 14.

PRESENT.—Messrs. J. R. Russell (chair), J. W. Crompton, G. and A. McCoy, H. J. Jagger, H. J. and M. J. Meyer, F. J. and J. G. Barratt, H. J. Dennis, H. Gray, E. A. Scarfe, H. I. Martin, V. G. Tugwell, and H. M. Parsons (Hon. Sec.).

DESTRUCTION OF RABBITS.—This subject was dealt with in an interesting paper by Mr. G. McCoy, from which the following is taken :—“ It has been computed that in one season a single pair of rabbits and their progeny can multiply to the number of from 120 to 160. Just think what that means in a country like this where there is everything a rabbit wants—abundance of various foods, good water in plenty, and, above all, the natural shelter for such an animal. The disastrous work of the little beasts is evident all round us, and it is only by combined efforts that we will be able to keep them down. If this is not done it will not be very many years before such a thing as a well-grassed paddock will be a novelty. Nearly every landholder in the district could easily muster 600 rabbits if it were possible to net them in on his grass land during the night. If six rabbits eat as much as one sheep that means that he is being robbed of grass that would keep 100 sheep. Some, no doubt, have not got this number, but the majority have more, according to the size of their holdings, and they are robbed in proportion. The rabbits eat the very best of the feed, even digging up the roots of the grass until the ground gets as bare as a billiard table, and the thistle seeds take root thus providing them with more shelter and hiding-places. There are 10 methods of dealing with the pest, the most effective being (1) netting them out; (2) poisoning; (3) fumigating; (4) trapping; (5) closing the burrows; (6) shooting; (7) destruction by means of dogs; (8) ferrets; (9) digging them out; and (10) starving. When netting, get the best 36in. x 1½in. x 18 gauge. This will last for years and can be put up for £24 per mile. Gum posts, 72yds. apart, with iron standards, 1½in. x ½in., 6yds. apart, one No. 8 wire to hold the netting up will be required, and 4in. of the netting should be buried. I find this effective for sheep, rabbits, and quiet cattle. One and a half inch netting is the usual thing, but I have often seen young rabbits go through this. If the ground is inclined to be loose and sandy, the rabbits may attempt to burrow underneath at first, but a few traps and the first rain will put a stop to that. So far I have not seen rabbits jump the netting here. I have seen them do it in the Port Lincoln district, but they had been educated up to it by the disrepair the netting had been allowed to get into.

Poison.—Every landholder should, when going round his paddocks, carry a small box of poison, and have a small hoe strapped to his saddle. A cartridge box is not bulky and will carry a large number of baits. A few minutes suffice to lay enough baits to catch a doe and her litter. Of course, where the rabbits are plentiful it is necessary to run the hoe for some distance, say, 100yds. For longer distances I should use the poison cart. A furrow has a great fascination for a rabbit, and he will follow it for yards. When using the hoe the same furrow can be opened out for fresh baits over and over again; this saves labor. The furrow should not be made in a very grassy place. A place nearly bare, such as a playing ground, is suitable. The reason for this is that where the grass is luxuriant the rabbit will not perhaps find the bait until he has satisfied his hunger somewhat, and will not then care about it. I place the baits 1ft. apart, so that they cannot miss them. Rabbits will take the poison even now, when the grass is green; of course, not so readily as in summer, but still, if only two or three are got every night, it means 600 or 700 for the year. They do not take the poison well the first night or second night, but the third and fourth night it goes rapidly. I think this must be because of the handling.

Fumigating.—This is very effective if the rabbits are in the burrows. A fumigator should have a smoker attachment to betray all small openings. Dogs should be sent round to hunt the pests into the burrows before starting operations. It is well to set traps opposite where the burrows are, as it frequently happens that one left outside will come and open them out. This leaves a doubt as to whether it is necessary to fumigate that warren again. A good fumigator can be got for £4, and the fumigating costs from 1d. to 2d. a warren, according to its size.

Trapping.—There is any amount of room for a reliable trap to be patented. Most farmers can tell of defective traps—pieces of rabbits legs cut off, traps which have gone off without any result, and consequently maimed rabbits running about too wary to be caught again. The dogs frequently get rabbits with only three legs and the fourth healed up perfectly from the old wound. There is a trap already on the market in Victoria something like a rat trap on a large scale, with the advantage that it always appears open. The rabbits that have been caught can apparently get out, but as soon as they go near the opening they tread on a board and raise a barrier against themselves. The rabbits coming in raise the same barrier behind them. One advantage of it is that it does not maim the rabbits. This does not appear to me to be faultless, for the rabbits running about inside must evidently put earth underneath the board, when, of course, it will not act, and then escape is easy. They will not go in there again. The price of the trap is 10s.

Closing Burrows.—This is slow work, but, nevertheless, I have found it answer to a certain extent. Throw some poison baits into the burrows, then pack the opening tight with sticks about 2ft. long, and fill in with earth. Before

they can burrow out they will get hungry enough to take the baits. Young ones will often never attempt to burrow out, but die of fright. A small piece of netting jambed tight into the burrows, and earth filled in, is also effective. One landholder makes a practice of filling in the burrows with earth and then pegs down about a square yard of netting over the hole. They will burrow up to the netting. He fills it up again next day and soon they will be found dead up against the netting. There is, however, a lot of labor in this method. *Shooting*.—This is expensive. In country where the cover is thick one cannot count on getting more than 70 per cent. for one's shots, and as cartridges cost 9s. 6d. a hundred, the rabbit skins must be all good to pay for it. There is very little shooting to be done in open country. *Dogs*.—This is mostly sport, but eight or nine good dogs will catch a lot during the day unless the warrens are too plentiful. Rabbits get very confused by a number of dogs. There is no dog to equal the sheep dog; he has the necessary intelligence and will work a rabbit against a netting fence splendidly. It is advisable to have one or two kangaroo dogs to do the sprinting in open country. *Ferrets*.—The use of ferrets is unsatisfactory. Even a well-trained ferret does not send them all out. In country like this we would not catch all that came out, and there is the waste of time getting the ferret back again. *Digging Out* should not be attempted. Putting the value of a man's time down at 7s. per day, I think he could be better employed than in this way. *Starving*.—This need not be advocated. It is almost impossible to starve a rabbit in this country. About 30 years ago I came across a host of travelling rabbits on the Murray Flats in the mallee. It was in the evening of a very hot day in a droughty season. For about a mile I drove through them; there was no water that I knew of for 20 miles in any direction, and none that the rabbits could get for much farther than that. In the country they had come through there was absolutely nothing for them to live on but dry saltbush and the bark of sandalwood. From every tree of the latter the bark was eaten up to about 2ft. from the ground, and the curious thing was that it was only eaten on the west side of the tree. The bark, being thicker on that side, contained more moisture. They were travelling slowly westward towards the hills, and looked very poor and emaciated, but I did not see any dead ones. When starving the rabbits one cannot use the country at all. They will live on bracken fern and the dry sticks of thistles. Several methods of eradication have been proposed by scientific men that are, to say the least, inhuman and decidedly dangerous to all living creatures. One is inoculation with some disease. It has actually been tried in places. Another thing advocated was to introduce enemies of the rabbit—the weasel for instance. We have enough pests already with the fox, the sparrow, the starling, codlin moth, and there is quite enough to do without more of the kind to battle against. Besides, those enemies of the rabbit have not yet proved capable of keeping him even within reasonable bounds anywhere. Still with all this, human ingenuity and patience can outwit the pest, and if every landholder netted his country it would be an easy matter to keep it down. Even on my land which is about as difficult as any in the district, I do not despair of getting rid of it. One sometimes hears the remark when a person is asked if he has any rabbits or his place—"Oh, yes, a few. Nothing serious, but I am not going to bother when they can come in from all sides." Now that is all the trouble. Those one or two will very soon mean one or two hundred; besides, one cannot tell that he has only one or two." In discussing the subject, Mr. Scarfe agreed that netting was the best means of getting rid of the pest. One No. 8 wire, however, was not sufficient to support the netting, as if the sheep ran into it they would cause a bulge, and it would soon become out of repair. Mr. A. McCoy said fumigating was best done in the hot weather, as the gas was then more effective, but rabbits could be destroyed at any time by this means. It did not, however, answer so well in rocky or stony country. Mr. H. M. Parsons, while agreeing with the writer that netting was the first and best means of getting rid of the pest, thought that good work could be done by trapping. Four years ago he netted in a square mile of country. One side of the paddock was already netted, and a six-wire fence was around the other part, so all that was necessary was to erect the netting. Three miles of netting and erecting cost about £50. He then put two trappers into the paddock. They caught about 900 rabbits and filled up all the burrows. Since then 100 more sheep could be kept in this paddock. Putting the net returns of wool at £25 per 100 sheep (last year he cleared £30 per 100), the extra 100 sheep kept on the block would pay all expenses of netting in two years. Last year floods carried the netting away in some of the water courses and rabbits got in, so he had a trapper in again and caught about 400. Afterwards this same trapper went into an 80-acre block belonging to a neighbor and caught 576 rabbits on this block in 10 days; this was equal to over seven rabbits to the acre. When poison was used there was a danger of the stock taking the baits. In reply to a question from the Chairman, Mr. McCoy said the rabbits would take the baits if they were covered lightly with sand,

but not so readily as if they were uncovered. A shallow trench for laying baits was best, as it was not so liable to wash out with the rains.

SEEDING OPERATIONS.—The following paper was read by Mr. M. J. Meyer :—"There is no hard and fast rule that can be laid down on preparing land for seeding, as there are different qualities of soil, and they must be treated differently. A farmer must find out what his soil is in need of. Everything depends upon having the seed put in well and at the right time, so it is advisable to have everything ready and so prevent delay. May and June are the most favorable months in this district for seeding, although I have seen some good crops that have been sown late in July, but these were favored by late spring rains. Where there is only the one team working, ploughing should be commenced after the first rains. Plough to a depth from 4in. to 6in. in heavy land, according to the depth of soil. It is no use turning up clay. Ploughing is the most important part of the work. If this is done carefully, and the land is well turned, it will be much easier to get it in good condition for sowing. I prefer the drill to the old method of broadcasting, even if one is not sowing superphosphate. The land should be harrowed before the drill, to level it and make an even seed bed. It is advisable not to work heavy land in this district to a fine tilth, as it will run together with heavy rains and bake. Work the land when in good condition and not too wet. With the drill sow from 1bush. to 1½bush. wheat and 2bush. oats. Wheat should always be pickled with a bluestone solution before sowing. If the seed is fairly free from smut, a light solution, i.e., 1lb. in 10galls. is sufficient. Pickle at least two days before drilling so that the seed becomes properly dry before it is sown. Always sow well-cleaned seed and the plumpest. See that it is true to name. A change of seed now and again is a good thing. Federation and Marshall's No. 3 are two popular wheats grown in this district. The latter is a good all-round wheat and it stands up well against rough weather. One fault is that it is rather slow growing at the start and sometimes it receives a check through the winter. More could be done in this district with the idea of determining the value of different varieties. Federation is a quick growing sort, which gets a good start before the cold weather sets in. Algerian oats do well here and return some heavy yields. They stand the wet weather and make good hay if cut when almost matured. I find Thomas' phosphate the best manure for this district; guano super. also shows to advantage. There is no need for bare fallow here: growing peas serves the purpose of preserving fertility in the soil and it is also a payable crop. I favor the rotation of wheat, oats, and peas." Mr. Crompton favored bare fallow. He would plough the ground up rough and allow it to remain until seeding, when he would cultivate it to a fine tilth. The manurial dressing he thought best was a mixture of bonedust and Thomas' phosphate. Mr. Jagger thought Marshall's No. 3 a wheat very susceptible to rust. Mr. H. J. Dennis had sown this variety for 14 years, but it was only during the last few years that it had been affected with this disease. Phillis Marvel suited the district. Last year it averaged between 4bush. and 5bush. more per acre than any other variety he grew. Early wheats did not do well. He had been fairly successful with barley, and did not think it was a crop that drained heavily on the soil. He did not make a practice of manuring heavy soil, but this was advantageous in light land. Mr. Jagger mentioned the case of a farmer in the South-East who had a particular area under barley for four successive years; the fourth years' crop was the best, averaging 40bush. to the acre. Members generally agreed that the grass was better on land that had been cropped and dressed with manure than on land to which no manure had been applied with the seed. Mr. Grey had drilled in gypsum with his crop, but the results were not satisfactory.

SORE SHOULDERS.—Mr. Meyer also presented the following notes on "Sore Shoulders on Horses":—"Some horses are more subject to sore shoulders than others, and it is difficult to keep them right, but in most cases the trouble can be overcome by a little attention. See that the collars are well stuffed, so that the pressure comes evenly on the shoulders. It is a bad plan to work a horse in an unsound collar as the dirt and sweat gather in the holes, form a hard lump, and chafe the shoulder. Do not have a collar too large; it is better to have it on the small side. See that the draught on the hames is right on the shoulder. A breast plate is of value to give a horse's shoulder a spell for a day or two. This can be simply made out of an ordinary wheat bag. Cut the bag down both seams and fold one-half into a band about 4in. wide; sew in a back-band hook at each end and a strap to go over the wither, and the thing is complete. Careful attention is the best prevention against the trouble. Brush the shoulders well in the morning and at dinner time, and see that there are no hard lumps underneath the collar lining. If a horse has sore shoulders, a good mixture to put on the patch is clean lard, melted down with a little powdered blacklead stirred in, and carbolic oil. Put a little of this on the sore before going out to work, and a little at knock-off time."

Ironbank. April 26.

PRESENT.—Messrs. C. Morgan (chair), R. Coats, F. Brown, A. Coats, L. Ahrens, W. Coats (Hon. Sec.), and three visitors.

MANURING FRUIT TREES.—Two members, viz., Messrs. Chas. Morgan and W. Coats, undertook to conduct experiments in their orchards for the purpose of determining how far the practice of manuring fruit trees was a payable one. The areas set aside for the purpose will be open for inspection by members at any time.

Kenmantoo. April 14.

(Annual average rainfall, 17in.)

PRESENT.—Messrs. T. Critchley (chair), R. Talbot, R. Critchley, W. Downing, H. Shepherd, R. Downing, S. Downing, E. Shepherd, J. Mills, W. Mills (Hon. Sec.), and two visitors.

CARE OF HARNESS.—Dealing with this subject in a paper, Mr. R. Talbot recommended the following treatment for harness. A tub half full of water, soapy, if desired, and not too hot to preclude the hands being placed in it, should be provided on a sunny day, and in this the leather of the harness should be thoroughly washed. Traces, girths, and other such parts on which there was likely to be an accumulation of sweat should be first treated whilst the water was hot. After washing, it should be left in the sun to dry, this being followed by the application of oil or polish as desired. It should then again be put out in the sun. All metal work should be polished, and to prevent the cracking of traces and back-bands at the buckle holes, a piece of leather about 2in. long, in which a hole had been punched, should be put over the tongues of the buckles. The harness should be kept in a shed free from dust and damp and of as even temperature as possible. Collars should not be immersed in water, but simply washed with a cloth and warm water. They should then be rubbed with neatsfoot oil. Cleaning as described should be undertaken two or three times a year. Where sweat was allowed to remain, the leather would become hard and break easily if bent very short. Mr. R. Critchley also read a paper on this subject, as follows:—"Farm harness is a very expensive item, but this expense can be minimised by proper care being taken of it. When some people buy harness they take great care of it when it is new, but as soon as the newness is worn off it is left lying in some corner or on a floor when not in use, instead of being hung up. I would advise purchasing nothing but the very best, as it will prove cheaper than second-class harness in the end. All harness should be kept under cover, as it will last much longer than when left exposed to the weather. It should be given a dressing that will preserve the leather and make it pliable four or five times a year. Neatsfoot oil and mutton fat will serve the purpose for the rougher lines of harness. Notice should be taken of all breakages, and they should be attended to either by oneself or the local tradesman. The lighter harness, such as buggy harness, should be taken to pieces and washed in warm water with soft soap and a brush until it is free from all sweat and dirt. It should then be hung in the shade to dry. This being done, a dressing of fat black or neatsfoot oil on the inside and Nugget on the outside will be of benefit, but care should be taken not to put on too much. Bridles and riding saddles should have a light dressing with coachaline or vaseline and the white of an egg; the vaseline should be put on first, afterwards the white of the egg. This will prevent any grease getting on to the clothes whilst riding." Mr. W. Downing said olive oil was the best dressing for patent leather. The most suitable false collar was one cut from a sheep pelt before it became too dry, the wool being turned towards the collar.

Meadows. May 20.

(Average annual rainfall, 35.62in.)

PRESENT.—Messrs. T. B. Brooks (chair), W. J. Stone, F. W. Vickery, B. Usher, H. A. Kloemann, J. Stone, H. L. Ellis, W. H. Bertram (Hon. Sec.), and two visitors.

NATIVE TIMBER.—This subject was dealt with in a paper by Mr. J. Stone, who drew attention to the fact that a great deal of timber was being destroyed. The Government should offer some inducement to landholders to preserve the young timber growing on their land, and mentioned the following native trees as being useful:—(1) The red gum was valuable for railway sleepers, fencing posts, &c.; a fairly durable timber and good fuel. (2) The cedar or jarrah gum, which, in addition to possessing the qualities of the

red gum, was said to be suitable for timber, the manufacture of flooring joists, and other building purposes. (3) The blue gum: valuable as sawn timber for building purposes, and as fuel and fencing posts. (4) Pink gum, which made excellent fencing posts unaffected by white ants. (5) Stringy bark; extensively used for fencing and, when sawn, for building, furniture, &c. It was particularly useful in connection with lime-burning, as it burnt very slowly. The mountain gum varied in quality, the more durable kinds being good for fencing posts, strainers, &c., deck-bearers, or bridges, and also for house fuel. Peppermint was a heavy timber not extensively used, but good for fencing, fuel, &c. It was generally found in comparatively low altitudes. The sheoak had been used for bullock yokes, axe and pick handles, and rails for fencing; in addition, in some instances, for the manufacture of furniture. It was also good fuel. Blackwood was very heavy when green, but when dry it became much lighter. It was used for bullock yokes, dray poles and beds, and also for furniture. During later years this variety of timber had suffered considerably through the mistletoe. Mallee was chiefly valuable for fuel. The manna gum varied in quality. In the autumn the branches shed bark and produced manna in some seasons, which had the appearance of crumbs of white bread. The wood was occasionally used as fuel, but was not of the best quality. The white or sugar gum was not durable, and the white ants were very destructive to it. Honeysuckle was not of much value, except that the wood was useful for skid blocks and, when well-seasoned, for fuel where a slow fire was desired. The cherry tree was more ornamental than useful. Its wood was very brittle, and it yielded a fruit used for cooking purposes. The swamp ti-tree was very tough, and was frequently used for thatching. The silver wattle was of little value as timber, as it soon perished. In some seasons the gathering of the gum was payable. The mistletoe, as in the case of the blackwood, did it a considerable amount of damage. In discussing the subject, the Chairman recommended landholders to plant trees on the north boundaries of their holdings to provide shade and shelter. Members generally considered that a considerable amount of valuable timber had been thoughtlessly destroyed in the past, and that something should be done by the State to educate landholders in this regard, and encourage them in the planting of native timber.

Morphett Vale, May 20.

(Average annual rainfall, 22½ in.)

PRESENT.—Messrs. H. V. Sprigg (chair), A. Connole, T. and A. Anderson, L. F. Christie, T. Higgins, W. Goldsmith, H. O'Sullivan, J. and E. Perry, F. Rosenberg, A. C. Pocock, and E. E. Hunt (Hon. Sec.).

Pigs.—Mr. J. Perry read a short paper, in which he said it was essential when keeping pigs that good breeding sows should be secured. He favored the progeny of the Berkshire crossed with a Yorkshire boar. If cared for, these would develop into good porkers, and at eight or nine weeks old should return about 30s. per head. They should be encouraged to feed when young. At two weeks old, if provided with a small amount of milk in a flat dish, they could in all probability be induced to feed. When a month old the boar pigs should be castrated, a sharp knife or razor being used, and this being carefully wiped after the operation had been performed on each animal. Ruptured animals should not be emasculated, but at the age of 10 weeks could be killed as porkers. Plenty of bedding should be provided in the sties, which should be kept warm, but not close, as fresh air was essential. Members discussed the paper at considerable length. Mr. Pocock thought crushed peas fed night and morning with a mid-day meal of crushed wheat, constituted the quickest fattening ration.

Mount Pleasant, May 10.

(Average annual rainfall, 27 in.)

PRESENT.—Messrs. H. A. Gilon (chair), T. C. Phillis, F. Langford, P. and J. S. Miller, V. Tapscott, F. Thomson, and D. C. Maxwell (Hon. Sec.).

MANURING FRUIT TREES.—In a paper on this subject Mr. Thomson said that while it had been shown that fruit could be grown without the addition of manure to the soil, if increased quantity and better quality were desired this practice was essential. It was necessary for each orchardist to determine what manure and system of cultivation best suited his particular conditions. Orange trees, for instance, required heavy dressings of manure, but if the soil were dug with a spade to a depth of, say, 6 in. a few weeks after the

manure was spread, not only would the crop fail, but there was a possibility of the trees dying. These trees developed a mass of small roots, which assimilated the manure, and after an application they should be shallowly cultivated with a rake or fork. Manuring would not pay unless proper systems of cultivation and pruning were carried out. Cultivation to too great a depth might nullify the effect of the dressing. He believed that judicious applications of farmyard and artificial manures, followed by shallow cultivation to keep the surface soil free from weeds, would be followed by increased yields of superior quality fruit. In discussing the subject, members cited instances where unmanured trees had carried good crops continuously for many years, and also where the crops had been considerably benefited by the dressings. Mr. Miller stated that he had dug a trench about 2ft. 6in. deep some distance away on each side of some trees that were not doing well. These were filled with old stable manure, and the trees subsequently made excellent growth, and the fruit improved considerably. Mr. Tapscott thought thorough cultivation and pruning all that was necessary for fruit trees in some soils. Members generally agreed that it was a mistake to put manure too close to the stems of the trees; it should be spread over the ground. Good cultivation was essential.

Narrung. May 17.

(Average annual rainfall, 17in. to 18in.)

PRESENT.—Messrs. G. G. Hacket, S. Bottrill, F. C. Baker, J. C. Scott, L. Mann, S. Morgan, G. Brodie, L. Thacker, E. L. and G. R. Goode (Hon. Sec.), and two visitors.

SHEEP ON THE FARM.—The following paper was read by Mr. G. G. Hacket:—"My aim in dealing with the various breeds of sheep is to show what I believe to be the most suitable and profitable kinds for small holdings. No one disputes the merits of the Merino as a wool producer, for it stands *par excellence* among all breeds for producing the finest textile fabrics; but, in conceding these merits to the Merino, one must not forget that they have originally descended from animals migratory in their instincts, and that inherited tendency makes them less likely to thrive on small enclosures than some other breeds. Where farms are fairly large, and where growth of grass does not attain to great luxuriance, Merino sheep will prove a profitable adjunct, and will be an excellent foundation for crossing where wool and carcass can be combined. In respect to crosses of the Merino, personally I prefer the Lincoln. This combination gives a profitable result in wool and carcass, and the ewes of this cross can be utilised for lamb producing with other breeds, preferably the Shropshire. The writer once purchased some 1,500 Lincoln-Merino ewes just prior to shearing at 8s. per head. They cut a fleece which paid their purchase price, and after shearing they were put to Shropshire rams. The resultant revenue from these ewes each financial year was over 20s. per head for about three years, and they were in the third year ultimately fattened off after producing lambs which were sent to market the third year, and they realised 16s. per head, thus making in their third year approximately 36s., or after deducting the original cost, 28s. profit. By putting Lincoln to the Lincoln-Merino cross one still increases the value of the carcass and maintains a fairly profitable wool with increased aptitude to fatten, and by the three-cross coming back to Merino gets a weighty saleable wool, perhaps one of the best lines for ready sale in all markets. The Lincoln again crosses well with the Shropshire, but from this point of view I would only recommend it for carcass purposes in the shape of lambs or hoggets for market. One year we crossed about 2,000 Lincoln ewes with Shropshire rams, and the resultant lambs were perhaps the finest we ever sent to market—1,200 averaged approximately 44lbs. dressed, and the balance 37lbs. The whole 2,000 averaged over 40lbs., a wonderful average. The Lincoln in itself is a good serviceable sheep for the farm—quiet and apt to fatten, and producing a weighty fleece, which becomes highly profitable in some years. The Shropshire is another breed suitable for the farm and for small areas. Its usefulness for lamb production is unquestioned, and it gives profit from its wool up to three years of its age, but its best qualification is its suitability for small holdings, and it will make condition and thrive in a very limited area. The Leicester sheep is also suitable for the farm, but excepting the Leicester-Merino cross I am not personally impressed in respect to its wool production, as it tends to extreme lightness in crossing and recrossing, and is not in my opinion so reliable in maintaining its standard of carcass or wool as the Lincoln. Kent-Romney Marsh sheep are also suitable for small areas, and where swampy lands prevail are more hardy than most British breeds. The Dorset Horn is perhaps one of the best for early and profitable lambs, but its wool capacity is not as profitable as some other crosses. Finalising my remarks, I may say that our locality is more suitable for the Lincoln and Shropshire as pure

breeds, and their crosses from the Merino. Sheep bred on these lines have proved in my experience of over 30 years to be more profitable than Merino, and perhaps I may say the same in respect to some other localities, for one has only to go to any part of the State, and from the scarcity of the crossbred deduce that they have been too profitable to remain either on station or farm. I doubt if one could purchase in this State a line of 1,000 six-tooth crossbred wethers of one earmark at the present time, simply for the reasons I have already stated."

Port Elliot, May 17.

(Average annual rainfall, 20'33in.)

PRESENT.—**MESSRS.** H. B. Welch (chair), J. Brown, H. Welch, J. F. Vince, H. Green, J. Chibnall, and W. E. Hargreaves (Hon. Sec.).

SHEEP.—**MR.** H. Welch contributed a paper under this heading. The droughty conditions experienced during the early part of last year, he said, and the consequent falling off in the quantity of wool exported would result in increased prices for wool. The export value of lamb and mutton was greater to-day than it had been for many years, and as a consequence the best lambs were marketed and the second rate animals were left to be the mothers of the future flocks. The policy of cutting up large estates into farms had resulted in some instances in the disposal of flocks, and as a consequence there was already a shortage of breeding ewes. Sooner or later the small grazier would have to study his little flock, and instead of disposing of his best and fattest ewe lambs would have to keep back a percentage for breeding purposes. He would have to breed a certain number of lambs each year for market, a few being held to renew the breeding ewes. Rejects could be put on peas or other such fodder and sold for killing as soon as possible. This would tend to at least check degeneracy. Owners of second-class land, on which sheep were being bred, should use good rams and ewes, so that the majority of the progeny could be saved for wool, and augment the supply of ewes fit for breeding. The southern districts varied so much climatically that it was difficult to determine the most suitable breed. The Lincoln and Shropshire would thrive in some of the colder parts. Breeders in warmer districts could either keep some of the mutton-producing ewes and cross them with pure Merino rams or second cross sheep, which were useful as mutton and wool animals. For this purpose the Shrop-Merino was hard to beat. The Lincoln-Merino also was strongly recommended by Mr. Matthews (the former wool expert). Both these breeds had degenerated of late years, and required careful attention. He recommended farmers to keep a few ewes of either pure Lincoln or Shropshire breed, mating these with pure rams of like breed and crossing the ewe lambs with well-bred Merino rams, thus producing a useful sheep for both wool and mutton. The progeny of these could then be crossed either by a Merino-Lincoln or Shropshire. If wool and mutton combined were required the Merino should be used; if cross wool was paying well the Lincoln should be utilised; but if mutton was the objective he would cross with the Shropshire. Farmers holding first and second cross ewes could breed for either finer or coarser woolled sheep. The ewe should be mated when two years old. To keep an even line of breeding ewes it would be necessary to cull out the worst doers, hairy sorts, and ill-shaped beasts, and fatten these for market. The clip should be kept as uniform as possible. Replying to questions, Mr. Welch said that after a sheep was five years old it should be fattened off and sold, as the weight of the fleece produced annually became lighter. The best fattening fodder was grass grown on land with a good clay subsoil. It was best, wherever possible, for each farmer to rear his own ewes. The Lincoln would do better than other breeds on wet, cold flats.

PICKLING WHEAT.—Members favored the floor method of pickling wheat, a weak solution of bluestone being the best pickle.

Uraidla and Summertown, May 5.

(Average annual rainfall, 44'35in.)

PRESENT.—**MESSRS.** H. F. Johnson (chair), S. Hawke, E. Hart, W. Squires, W. Bessell, J. Rowe, R. H. Shueard, E. Hawke, A. Moulds, T. H. Collins, and Geo. Prentice (Hon. Sec.).

ONION-GROWING.—Dealing with this subject in a paper Mr. R. H. Shueard said onions for seed purposes should not be selected solely on account of size, but shape and color should be considered; in addition to which it was necessary to see that the onion was

firm around the crown. Heavy, dark soil, well-manured with stable manure and a little bonedust, and situated so that it could be irrigated, should be selected. This should be dug deeply, the onions being planted in rows 2ft. apart, with about 12in. to 15in. between the plants in the rows. They should not be covered deeper than the crown, and the ground should be carefully hoed to kill weeds. Onions for seed should be planted in September or October, and when ripened should be cut and left to dry. For rearing the plants a well-drained dry piece of land unlikely to be affected with frosts should be selected. The seed should be put in drills about 10in. to 12in. apart in March, and as soon as the plants showed above ground the soil should be hoed. A practice sometimes adopted to destroy the weeds was to burn boughs of trees on the ground and turn under the hot ashes. The plants should be ready for transplanting by the end of September. The soil should be of a heavy, dark, sandy nature, and before being worked should receive a good coat of manure. The plants should be put in 4in. to 4½in. apart in drills about 10in. apart. The ground should be hoed as soon as the plants showed signs of taking root, and again a little later, this working being repeated at a later date. Water was better applied by flooding than by means of the sprinkler. Onions which were intended for keeping should be perfectly dry and preferably hung in bunches. They should on no account be placed on the bare ground. The best keeping sort was Brown Globe. Mr. E. Hawke thought the best time to plant was the end of August and beginning of September. He preferred spreading the manure on top of the land and raking it in. When storing he advised cutting the tops off the onions. Mr. Rowe thought the manure should be well distributed in the soil. Watering by soaking the land from underneath was best. Mr. Squire favored shallow transplanting. Mr. E. Hart thought 6in. to 7in. far enough between the rows. He preferred running the water down the rows after slightly banking the onions. Mr. H. F. Johnson thought land that did not require to be irrigated best for this crop. In reply, Mr. Shueard said the manure should be turned in to a depth of 8in. He would store the onions in heaps to a depth of 3ft., and would not disturb them until marketing. If land that did not need watering could be secured so much the better. A fair crop should be one ton from 10,000 plants.

SOUTH-EAST DISTRICT.

Kalangadoo, April 12.

PRESENT.—Messrs. D. Tucker (chair), Sudholz, Kennedy, Bott, McCorquindale, and Bonnett.

POTATO SCAB.—Mr. Bott reported that he had planted seed potatoes affected with the scab on both old and new land. The resulting crop in each case was attacked by the disease, but the potatoes were suitable for eating when peeled. Members thought the dryness of the soil and not the nature of the seed used was the cause of the scab. Cases of clean crops being secured from affected seed were mentioned. [The fact that under some conditions clean crops have been secured from scabby seed does not affect the wisdom of planting clean seed as a general practice to minimise the risk of disease.—Ed.]

Keith, May 17.

(Average annual rainfall, 19·20in.)

PRESENT.—Messrs. J. MacIntyre (chair), J. Lock, F. W. Schultz, W. H. Morcom, E. J. Hutchings, W. Dall, J. B. Makin, A. V. Thompson, H. Pearson, J. Tyner, W. Graves, E. Aberle, G. Leishman, jun. (Hon. Sec.) and six visitors.

LIME AND SOIL.—The Hon. Secretary read a paper on this subject. Lime, he said, was one of the chief ash constituents of the clover and root classes of crops, and it occurred

in smaller proportion in the ashes of other plants. Applications of lime to pasture lands had increased the growth of grass, and in the case of cereals grown in soil deficient in lime content the grain was defective. Although a plant food, lime was not generally applied to land for its direct plant-feeding advantage, but rather for the purpose of making available other plant foods. Potash and soda were bound up with the silica and other mineral substances in the soil in an insoluble condition. Lime, being a powerful base displaced the potash and soda, allowing these to form compounds with any acids existing in the soil. It also assisted in the formation of nitrate of potash and the double silicates in the soil. It caused the organic matter to break up into water, carbonic and organic acids, and ammonia, therefore liberating nitrogen in the form of ammonia. Its general effect was to render available plant food already in the soil, without itself supplying any significant amount. If lime were continuously applied to soil without the addition of fertilisers it would gradually exhaust the supply of plant food. It also tended to sweeten soils soured by the presence of the poisonous salts and lower organic acids. It had the mechanical effect of improving the texture of the soil, making clay more open and friable and sandy soils more retentive. It was applied in different forms, *i.e.*, quicklime, slaked lime, crushed limestone, and marls and sandstones containing a large percentage of lime. Quicklime or burnt lime was very caustic, and was generally only applied to peaty soils containing a quantity of organic matter, stiff clays, and sour soils. Calcium carbonate was used ordinarily, and this was not so caustic in its action. A good method of application was to break up the ground deeply in early winter, and spread bags of burnt lime over the field in small heaps, slacking the heaps immediately. In three or four weeks the action of the air would result in the formation of carbonate of lime, in a very much finer state than the original limestone. The heaps should then be distributed evenly with shovels and light harrows in winter. As the lime had a tendency to sink in the soil, it should not be ploughed in. The quantity to apply depended on the nature of the soil, the frequency of the dressing, the depth of the soil, the content of vegetable matter, and the system of tillage adopted. One ton per acre would give good results on clay soils for five years; and on lighter soils useful results could be secured from dressings of half a ton per acre. In America up to 3 tons per acre had been profitably applied. Mr. J. Lock thought a dressing of half a ton to the acre in the lighter soils in this district would prove too expensive. In reply to questions, the Hon. Secretary said that the lime would cause the sandy soil to retain more moisture, but he did not think the surface would set hard. It would be cheaper to crush limestone, and the results would be as good as where burnt lime was used. Mr. Makin said if a 2bush. increase were secured from the land with the addition of lime the venture would be profitable. He favored the use of burnt lime.

Lucindale, May 3.

(Annual average rainfall, 22½ in.)

PRESENT.—Messesrs. Rayson (chair), Secker, Fergusson, Dow, Langberg, Carmichael, Norsworthy, Beaton, and Secker (Hon. Sec.).

WEEDS FOR IDENTIFICATION.—Mr. Dow tabled a weed, which was identified by members as *Linaria Elatine*. Mr. Dow reported that stock would not eat the plant, and he had tried several different means to get rid of it, but without success. Mr. Richman exhibited a specimen of *Euphmera Ivensis*. Mr. Rayson stated that this weed was a great pest in the garden, as it outgrew other plants, but stock would eat it readily.

Millicent, May 12.

(Average annual rainfall, 29·25 in.)

PRESENT.—Messesrs. J. J. Mullins (chair), H. Hart, J. Bowering, W. Downs, H. F. L. Holzgreffe.

SELECTION AND GRADING OF SEED WHEAT.—A newspaper cutting dealing with the importance and value of selecting and grading seed wheat was read by Mr. Holzgreffe, who then urged on members the necessity for securing greater returns from their land. Land values were rising, and the plough, harrows, strippers, drills, &c., had to be taken over the area irrespective of whether a 6bush. or a 30bush. harvest was being secured. Thorough working of the smaller areas was better than careless farming on a large scale.

Mount Gambier. May 10.

(Average annual rainfall, 31½ in.)

PRESENT.—Messrs. Wedd (chair), Sassanowsky, Pritchard, Watson, Keegan, Schlegel, Ruwoldt, Holloway, Innes, and Collins (Hon. Sec.).

GALVANIZED IRON AS STACK COVERING.—Mr. R. P. Pritchard read the following paper, which has been slightly abridged:—"In covering a stack with galvanized iron, it is not desirable to run it up to a high, sharp roof like that of a church. A stack that has been built with the middle kept as high as it should be kept, is about the most convenient shape for roofing with iron. This, in itself, is a strong recommendation for this method of roofing, because it removes that uncertainty that usually exists when finishing the building of a stack, as to whether there will be enough or too much hay to complete the roof portion properly. And, in addition to this, the walls can be carried considerably higher without the necessity of a staging or a pitch hole. Briefly, the plan of operation is as follows:—The top of a well-built stack, when the middle is kept properly full, presents the appearance of a hip roof with a low pitch. In preparing this surface for the reception of the iron, it is necessary to further fill up the middle at both ends of the stack so that the middle ridge will form a straight line from one end to the other, and about three feet higher than the eaves. A gable roof is the shape aimed at. I use sawn timber to nail the iron on, but good straight saplings will do as well. For a stack of, say, 100 tons six rows of battens or palings will be needed; for a smaller or narrower stack four rows will do. Commencing at one end of the stack, select either six or four battens of equal length, according to the width of the stack. Place one at each side of the ridge or centre, near the top, one at each of the eaves, and, if a wide stack, one in between the ridge and eave. As there is nothing to nail the battens to, place a length of fencing wire across each end of the battens, and, making sure that the battens are placed correctly to suit the lengths of the sheets of iron, staple the wire firmly to the battens. The ends of the wire should hang well over the side of the stack, and some weight, such as a fence post, should be firmly attached thereto. The iron may now be nailed on, using springhead nails, and as few as possible. Give the sheets one lap only to make the most of them, and let them overhang about a foot at the eaves. When all the iron is nailed on the first section, proceed to lay the battens and wires for the next section in exactly the same manner, and so on until the stack is covered. This may sound rather like a lengthy job, but it is not by any means so. Two men can roof a ninety-ton stack in a day quite easily, and this is very much quicker than is the case with straw thatching. The iron, if taken care of, will last for a number of years, and the results will well repay anyone for the initial outlay. I may mention that cloudy or slightly damaged iron can be bought at a reduced price, and is quite suitable for the purpose. For a stack 6yds. wide at the bottom, 8ft. sheets will be found about the right length, and, by allowing four sheets for every 2ft. of the stack's length, the number can be easily calculated. Thus a stack 12yds. or 36ft. long will need approximately 72 sheets of iron. When it becomes necessary to remove the iron, use a pair of ordinary pincers. Take a firm hold of the head of the nail, and place a half-round piece of wood in the hollow alongside for a fulcrum, and lever the nails out. The advantage of having put the roof on in sections will now be apparent, for any one of these sections, or half of them, may be removed without interfering with the remaining ones. The secret of successful and economical use of galvanized iron as a stack covering lies in putting it away carefully when finished with for the season, and collecting the battens and weights, so that they will be ready at hand when again needed." In reply to questions, Mr. Pritchard said he usually put timber under the stack. A stack, 12yds. by 6yds., which would require about 72 sheets of iron, would entail an outlay of from £10 to £11 for the iron. It would take two men the greater part of a week to thatch a stack of that size. In view of the simplicity of the system advocated, he did not think it desirable to build permanent sheds. The roof would stand very heavy winds. Asbestos, he thought, would be unsuitable for this purpose. Mr. Smith drew attention to the great amount of waste which generally occurred at the bottom of haystacks. Straw was frequently used as a foundation, but the material tended to draw up the moisture. Mr. J. Watson thought it would be better to erect poles at the side of the stack and place a permanent covering of iron over it to obviate the trouble of building up and taking down each season. Mr. Sassanowsky agreed. Frequently stacks were built on raised platforms about 2ft. from the ground; on this squares of tin were placed, which effectively protected the hay from mice. Generally it was the roof of the stack that was damaged by this pest, therefore there was proportionately less loss in a large stack of about 70 tons or 80 tons than in one of, say, 20 tons. At Roseworthy Agricultural College, Mr. Holloway had seen a stack roof supported by about 8in. posts sunk into the ground to a good depth. Around the foot of the stack there was sheet iron about 2ft. 6in. high, and extending

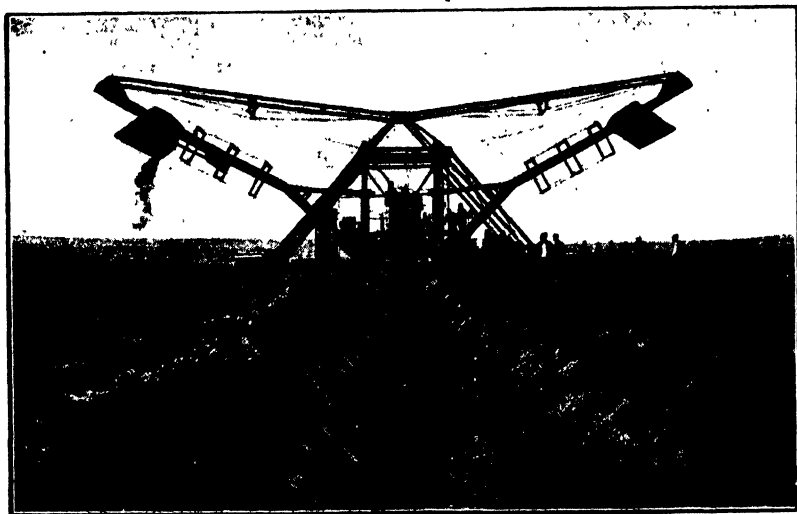
6in. or 8in. into the ground. Mr. Collins favored the erection of poles at each corner of the stack, and between these he would place a roof of iron and crosspieces, which could be raised or lowered by means of pulleys.

Penola, May 3.

(Average annual rainfall, 26½in.)

PRESENT.—Messrs. H. Richardson (chair), D. Adamson, L. W. Peake, P. H. Kilsby, W. Miller, D. A. Fullerton, A. E. Lampe, S. Ockley (Hon. Sec.).

COMPULSORY REGISTRATION OF STALLIONS.—Mr. Fullerton opposed the resolution of the 1912 Congress. It was too hard on owners of stallions, because so many horses certificated as two-year-olds were rejected when five years old. The judgment of the veterinary surgeon was often unsatisfactory, and rejected horses were frequently patronised because of the satisfaction given in their stock. Feeding was more important than breeding. There was plenty of inducement for breeders to see that their stallions were suitable without any compulsion. Many kept stallions for their own use and allowed a few of their neighbors' mares to run with the horses for a fee. This would be prevented under the proposed legislation if the stallion was not registered. The Hon. Secretary said the present system of examination was sufficient. Every effort should be taken to keep the price of horses as low as possible to encourage the increasing agricultural developments everywhere, and with farmers who were just starting the cheaper bred horses filled a very important place. If the Act came into force it would lessen the number of stallions, causing the serving fee to go up and the price of horses to increase, while it would not increase the number of good horses. The veterinary officers would have things as they wished; there was no system of appeal when a rejection was considered unmerited by an owner. [The Chief Inspector of Stock, to whom this was shown, points out that there is provision in the existing regulations under which stallions are examined before being exhibited at shows for an appeal to be made against the decision of the veterinary surgeon. Up to the present no such appeal has been made.—Ed.] The Chairman said that no doubt provision would be made to recompense owners who were compelled to castrate their rejected horses, and it was pitiable to see the increasing number of mongrels in evidence. Mr. Peake thought the proposal was a safeguard for owners of mares. It applied only to stallions travelling for hire. It was only right if a person were travelling a stallion that the owners of mares in the district should have a guarantee that the horse was sound. A motion, "That this Branch is not in favor of compulsory registration of stallions," was carried.



Excavator, Mypolonga Reclaimed Area.

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All communications to be addressed:

“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”

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T. PASCOE,

Minister of Agriculture

POINTS FOR PRODUCERS.

Agricultural Bureau Silver Jubilee.

The Agricultural Bureau of South Australia was founded early in 1888 and the first meeting was held on April 10th in that year. It has been decided to celebrate the 25th anniversary by a banquet at the Opening Session of the Congress on September 8th. The Brookman Hall in the School of Mines has been secured for the occasion, and the Congress will be held there throughout. His Excellency the Governor has graciously consented to deliver an address. Other speakers will be the Hon. the Minister of Agriculture, **the Chairman of the Advisory Board of Agriculture**, and Professor Lowrie, who is one of the original members of the Central Bureau and attended the first meeting. Certificates of Life Membership will be presented to those members of the Bureau upon whom this distinction has been conferred. Every branch of the Bureau has been invited to send delegates to the Congress and to the opening banquet. Particulars as to purchase of tickets, fares of delegates, &c., may be obtained upon application to the Secretary to the Advisory Board.

Farmers' Conferences.

Conferences of Agricultural Bureau delegates and other farmers will be held at Cowell (Franklin Harbor) on August 1st, and at Pinnaroo on August 14th. In both instances there will be sessions in the morning, afternoon, and evening. Local committees have the agenda and other arrangements in hand, and it is probable that the proceedings will be quite equal to the high standard of effectiveness and practicality attained in past Bureau Conferences. It is anticipated that members of the Advisory Board and officers of the Department of Agriculture will take part as usual, and that valuable papers from Bureau members and consequent discussion will not be lacking. At Pinnaroo two matters of importance, viz., the cultivation of sandy land and takeall, will receive special consideration. A free parliament will be held prior to the address of the evening. All farmers and others interested will be welcomed to these Conferences.

A Water-Finding Machine.

The *Queensland Agricultural Journal* contains an interesting article on "Water Supply for Farms," in which the water-finding machine, of which the Government of that State possesses two, is described by the makers as follows :- "The principle on which it works is the measuring of the strength

of the electrical currents which are constantly flowing between earth and atmosphere, and which are always strongest in the vicinity of subterranean watercourses, the flowing waters of which are charged with electricity to a certain degree. Should a subterranean spring be present under where the instrument has been fixed, the needle commences to move, note being carefully taken of the number of degrees on the scale, and the position of the instrument changed from time to time; the spot where the greatest movement of the needle has been obtained is that where the well boring should be made. If the needle remains stationary, it may be taken for granted that a spring does not exist under the spot where the instrument has been fixed."

Speaking of Meat.

Speaking of meat (says the *Pacific Rural Press*), the tariff, and such, reminds us of Germany and the meat business. Spero, the German economist, says that his country is utterly unable to get the meat it wants without pulling it over the tariff wall. Municipal authorities are doing that very thing, and the demand for more meat is so strong that the wall will probably be lowered or leveled to make the pulling easier. This step the *London Live Stock World* thinks will be the beginning of the end of all meat tariffs of Europe, and that much beef, mutton, and pork formerly going to Britain will soon go elsewhere, which will cause a revolution in the British meat trade, a sharp advance in prices, and consequently a greater profit in stock-raising in exporting countries.

Measuring Hay in Stack.

For obtaining the number of tons of hay in a stack the first step is to measure the width and length with a tape line, and then what is known as the overthrow, that is, pass a tape line from the bottom of the stack on one side over to the bottom on the other side, and divide this measurement (which is called the overthrow) by three, then multiply the length by the width, and this by one-third of the overthrow: this gives you the number of cubic feet in the stack. Of course, if the stack is different widths or different heights one will have to take the measurements in several places and obtain the average of these by adding them together and dividing by the number of measurements made. The number of cubic feet of hay per ton varies considerably with the length of time that it has been stacked. With newly stacked hay it will take about 500 cub. ft. to equal a ton; if it has been stacked for two or three months, from 350 to 400 cub. ft. will equal a ton. After you have obtained the number of cubic feet in the stack, divide by the number of cubic feet in a ton, taking into consideration the length of time that the hay has been stacked.

Warts on Cow's Teats.

A trouble which the milker has sometimes to deal with is that of chaps and warts on cows' teats. Warts appear on any part of the animal, and wherever situated, always detract from the appearance of the animal. In all cases warts are a disfigurement, and the majority of them prove a great inconvenience, especially when they form on parts where most offensive, such as the teats or lips. Some stockmen appear to take practically no notice of warts, and allow them to grow to great sizes on the cows. This is a sign of great carelessness on the part of the person in charge of the cows, as the larger the warts are and the longer they have been growing, the more difficult will be their removal. In this case it is painful to the cow when milked, therefore warts and chaps should be got rid of as soon as possible. Many people fail to get rid of warts because they think it can only be done with great difficulty or by tearing the wart bodily away, but this is not the case. When cows are milked twice a day it does not seem to afford much opportunity to get rid of warts. To use any substance of a poisonous nature for the wart is dangerous in many ways. When the teats are chapped only, some kind of soothing ointment should be applied, and for this purpose carbolized vaseline and other preparations may be procured from the chemist. This will heal the teat up in a short time, and allow the milking to be carried on without any discomfiture to the cow. In the case of warts, when small they can be generally got rid of by touching them with caustic soda. Another simple remedy, and one which in many cases has been found to be successful rub the wart with vinegar, then while it is still wet dust it with dry carbonate of soda. If this is done after each milking, the warts will gradually get smaller and finally disappear.—C. W. Walker-Tisdale in *Farm and Home*.

Farmers' Wages in New York.

Receipts and expenditures from 2,409 farms in 14 townships in New York show that only one-third of the farmers made more than a laborer's wages, plus 5 per cent. interest on capital. Returns from six other States show that less than one-third of the farmers make farm wages. *American Agriculturist*.

Dry Bible.

In an article in the *Agricultural Journal of the South African Union*, entitled "Chemical Conditions Concerning Lamziekte," Mr. Stead, of the Public Health Department of the Union, corroborates the views of the Government Veterinary Lecturer on dry bible paralysis, showing that the disease is caused by deficiency of certain elements in the food.

Unit Characters of the Horse.

The unit characters of the horse may, in a tentative way, be stated to be as follows : - The finer qualities are recessive to the coarse ones, as the thin, pointed ear is recessive to the thick one ; the clean, small head recessive to its opposite ; the short neck to the long one ; the flat foot recessive to the mule foot ; the calf knee dominant to the straight, perfect knee ; strength dominant to weakness ; true action and superior action recessive to untrue and inferior action. In color, chestnut is recessive to grey, bay, and black. —*American Breeders' Magazine.*

Extracting Olive Oil.

According to the *Pacific Rural Press* a new method of extracting olive oil from fresh olive pulp is to use two concentric cylinders separated by a narrow space : the outer is sheet metal, the inner a metallic screen. The olive pulp is placed in the inner cylinder and kept in motion by a revolving axle with aluminium pallets. By means of a suction fan attached to the lower half of the outer cylinder a slight difference of pressure is maintained between the two ; the oil and water are thus extracted from the pulp. Contrary to the results in the ordinary press the oil comes out more easily than the water, the greater part of which remains in the pulp. Ten per cent. more of better quality oil is produced by this process. The olives can be worked fresh, and troubles from drying, moulding, and rotting are avoided.

New Use for a Butter Factory.

A co-operative laundry run in connection with a butter factory has resulted in the ladies of the farms concerned wondering why it was not begun before. Washing day has now become visiting day. —*American Agriculturist.*

Germs in Milk.

Writing in the *American Agriculturist* Prof. Rasmussen points out that a bacteriological count is a very unfair thing upon which to condemn a milk sample, as many of the bacteria are desirable. The character, not the number of germs, should be the criterion.

Oat and Pea Forage.

Oat and pea forage, says an American journal, run through the silage cutter in a slightly wilted condition forms prime silage for dairy cows, and the milk flow is maintained through the dry time when there is an entire lack of green food.

Manuring of Grass Land for Milk.

An experiment in manuring grass land for milk was carried out by the Midland Agricultural and Dairy College in 1912 for the fourth year in succession. Eight acres were dressed in 1909 only with 10cwts. per acre of ground lime to get rid of moss, and half the eight acres was manured in addition with 4cwts. of high-grade superphosphate and $1\frac{1}{2}$ cwts. of sulphate of potash per acre. On the manured plot the herbage was more abundant than on the other, and contained a much larger proportion of clover. Two lots of cows, as equal as possible, were fed on the two plots, being shifted fortnightly. It was found that the usual reduction in the milk yield as the season advanced was much greater in cows when shifted from the manured to the unmanured plot than when the change was in the opposite direction. At the end of the three months of the trial it was found that 119galls. of milk more from the manured than from the unmanured plot were obtained per acre. This compares with 81galls. in 1911, 86 in 1910, and 84 in 1909. At 6d. a gallon the extra milk in 1909 was worth £2 2s., and the manures cost £1 9s., leaving 13s. profit. In the other years, as there was no expense for manure, the gains were all profits, and for the four years the profit per acre was £7 16s. There must have been a further profit from grazing after the trial had ended in each year. —*Agricultural Gazette*.

Imports and Exports of Fruits, Plants, Etc.

During the month of June, 1913, 18,543bush. of fresh fruits, 565 bunches of bananas, 8,647 bags of potatoes, 8bush. of sweet potatoes, 76 cocoanuts, and 121pkgs. of trees, plants, bulbs, etc., were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Act of 1885; 50 bush. of bananas were destroyed (over-ripe). Under the Federal Commerce Act, 1,213 cases of fresh fruits, 4,583pkgs. of dried fruit, 148pkgs. of preserved fruit, 203pkgs. of honey, and 7pkgs. of plants were exported to oversea markets during the same period. These were distributed as follows:— For London, 3,003 pkgs. of dried fruit, 67 cases of oranges, and 200pkgs. of honey. For Hamburg, 2 pkgs. of honey; for South Africa, 695pkgs. of dried fruit; for New Zealand, 10 cases of oranges, 225 cases of lemons, 885pkgs. of dried fruit, 6pkgs. of plants, and 1pkg. of honey; for India and the East, 911 cases of apples, 148pkgs. of preserved fruit, and 1pkg. of plants. Under the Federal Quarantine Act, 4,198pkgs. of plants, bulbs, seeds, nuts, etc., were examined and admitted from oversea markets.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

STOCK INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

"F.S.B." has a nine-year-old mare with chronic discharge under jaw. He asks for treatment.

Reply—Apparently there is a carious abscess affecting a molar in the lower jaw and the duct of one of the salivary glands has become infected as well. Veterinary tincture of merc. corr. 10 drops twice daily on the tongue, and dusting the opening of the abscess daily with a little Cooper's sheep dip may effect a cure, but probably surgical treatment is needed.

The Booleroo Centre Branch inquires what is the best treatment for a horse with a strained muscle just above the fetlock.

Reply—There is no muscle just above the fetlock; but three tendons, usually spoken of as the back tendons, may be found there, and the inner one of the three, the suspensory ligament, divides and passes round the joint to the front; the point of division is a frequent seat of strain. Treatment means rest from work, but walking exercise is desirable, frequent hand-rubbing, and, if a light horse, a tight bandage. Tincture of arnica, loz., in methylated spirit, one pint, will be found a good application to be well rubbed in twice a day.

The Booleroo Centre Branch wants the reason why stock prefer smutty hay or chaff, and if it is in any way injurious to them.

Reply—Probably stock do not prefer smutty fodder on account of the smut, but for some other quality which appeals to their taste. Smut, however, does give a spicy flavor in some instances on account of its destroying certain of the feeding ingredients of the fodder, just as mould does. As a matter of fact, stock may appear to do better on smutty fodder for a time because the liver has to work harder to destroy the poisons. A similar condition is noted in the early stage of fluke in sheep, but eventually they will go back, and it

is more than probable that smut plays an important part in the causation of those paralytic diseases which are found in South Australia. It is well known that smut is dangerous to fowls, and quite recently the writer has found it produce disease in pigs. It is a bad policy to try and defend smut on any ground whatever.

"T.A.W.," Miltalie Branch, has a five-year-old gelding, a slack and poor doer, which has swellings about the tongue and jaws, some of which have burst and discharged offensive matter into the mouth.

Reply -As no local cause can be found for the swellings, such as grass seeds, etc., it may be presumed that the horse has a form of blood poisoning, known as "pasteurellosis." The mouth should be well cleaned out daily with a solution of Condy's crystals, as much as will lie on a threepenny bit to two quarts of water; this can be done with a small mop or swab. Give on the tongue twice a day for a fortnight three grains of iodide of arsenic mixed with 10 grains of sugar of milk, green food if available, and rest until much improved.

"W.T.," Watervale, inquires a remedy for tick in pigs.

Reply The ticks are probably lice. Spraying with Cooper's sheep dip is very effectual, especially if the pigs are rubbed over with any cheap oil, such as train oil, afterwards; it is well to mix some flowers of sulphur, $\frac{1}{2}$ lb. to the gallon, with the oil. The treatment should be carried out once a week for three weeks, care being taken that the dip does not fall anywhere where the pigs can get at it to eat after. The sty will also want attention. If of wood char off with a painter's burning-off lamp, spray all over with 3 per cent. solution of formalin or coal tar disinfectant, then limewash with hot lime. Walls, floor, roof, all want doing, and doing thoroughly. Burn litter, &c. Give charcoal or wood ashes with a little sulphur in the food.

"R.O.R.," Talia, has a fine draught colt with a salt lump on each stifle, the bones of the joints can be heard grating. Is there any chance of recovery, or should the foal be shot?

Reply -Although not mentioned, the navel was probably swollen soon after birth, as the condition of the joints points to the entrance into the system of septic germs, and if there are other colts in the neighborhood similarly affected it would be well next season to dress their navel strings with tincture of iodine as soon after birth as possible. It is difficult to reply to the latter questions without seeing the colt, which in the meantime may have died, if not it would be well to drain the fluid from the joints and syringe the sac daily with half a pint of a 10 per cent. solution of acetone, an expensive drug, but the only one which has a satisfactory action in such cases.

The Nantawarra Branch reports cases of mares slipping foal and their breeding bag coming down, and requires hints as to what should be done in the latter case (eversion of the womb).

Reply—When this accident happens, get the copper boiling as soon as possible, a couple of old clean sheets, Condyl's crystals or washing soda, soap, a couple of helpers, and a couple of clean towels, and some lard or butter. Let the helpers get a sheet under the bag, and thoroughly wash it free of all dirt, &c., remove the cleaning if still fast to the bag. Having stripped to the skin, have the clean sheet held under the bag to raise it till the breast can press against it, rub it well with lard, then with both hands massage it where it enters the bearing till it can be felt to be less hard, and gradually bring one hand back so that with the doubled fist pressing firmly but gently on the bottom of the bag, and the breast still helping, the bag can be gradually pushed back, never giving it a chance to slip again. It is a lot easier to talk about than to do. When it has returned to its place keep the arm in till it can be felt to contract on the arm, then slowly withdraw, and swab out with Condyl's crystals, as much as will lie on a sixpence to 2galls. of water that has been boiled and cooled down; add a small handful of washing soda, leaving the swabbing towel in for a few minutes. Keep the mare with her head down hill, or raise the hindquarters on clean straw. If she strains much give 2ozs of laudanum or one of chloral hydrate in a little warm gruel. If these do not stop the straining take two meat skewers and pass through the skin on either side of the bearing up and down and weave broad tape across them. This is much better than sewing. They can be removed next day. Ten drops of veterinary tincture of arnica three times a day for a few days will do good.

POULTRY.

"W.O.F.," Wirrega, asks a number of questions relative to the feeding of laying hens.

Reply—(1) Use 2½ozs. of meat meal twice a week for the 13 hens. (2) You can dispense with the meat meal if you have plenty of rabbit. Give rabbit and soup in the mash, say half a rabbit, daily. (3) Crushed wheat and bran. Use enough bran to make a crumbly mass, about equal parts. (4) Yes; baked wheat is excellent. (5) Green bone is not necessary. (6) Yes; use the crystals (permanganate of potash), but also scald out and scrub clean the water pans. You need not use bone meal.

"C.B.R.," Hawthorn, requires treatment for fowls having black spots on their combs and are becoming blind.

Reply—Your fowls appear to have chicken pox. Bathe the comb, &c., with equal parts of vinegar and water. Dry well, and then apply carbolic glycerine (one part No. 1 carbolic acid, 16 parts glycerine). Apply daily. Give the fowls a pinch of Epsom salts in the drinking water.

"E.W.H.," Cowell, asks for information regarding breeding, accommodation, &c.

Reply—(1) You should not breed from pullets, but from two-year-old hens. If your pullets are full grown you can use them, but the stock will not be so

good. The cross Padman-Purvis will be all right. (2) Dry mash is generally made of bran one part, pollard two parts, a little Government meat meal added and fed dry in a hopper. No water is used in mixing. (3) House (8ft. x 12ft. or 15ft.) is quite large enough for six or 12 birds for the whole year. (4) Use a little Epsom salts, one packet to 20 adults once a week. If you use wet mash you can soak in boiling water some ordinary hay chaff. Soak at night and mix in the morning one-third by bulk with the bran and pollard.

"W.J.L.K.," Quorn, states that he has lost two of his best hens through a disease of which the symptoms are, first, the crop gets full of food (they do not appear to be crop bound), then the droppings get green and yellow, and the trouble takes them off in two or three days.

Reply—Obtain the following powder from a chemist, about 2s. 6d. worth will do:—Santonine one part, ground arca nut seven parts by weight. Dose for 20 adults—One heaped teaspoonful mixed in dry bran and pollard sufficient for a light feed. Mix carefully and then moisten to a crumbly mass. Withhold the usual evening feed of wheat the night before so that the birds will be empty and the parasites hungry. Repeat dose in one week. Give to the whole flock.

HORTICULTURE.

"J.R.H." asks for information regarding the most suitable kinds of peach, apricot, and plum trees to plant for fruit-drying purposes.

Reply—The Horticultural Instructor (Mr. G. Quinn) advises as follows:—Peaches—Early Crawford, Elberta; apricot—Moorpark; plums—Prune Splendor, Prune D'Agen, Prune Fellemborg,* Coe's Golden Drop,* Jefferson.

"J.B." asks if young or small trees will be damaged if sheep are grazed in the orchard.

Reply—I would not advise the grazing of sheep in an orchard of young or small trees, even when the trees have reached a mature size. Sheep will sometimes chew the bark of limbs or stems if they are not coated in rough bark.

A member of the Koppio Branch asks the correct time to bud the loquat on to the quince.

Reply—The Horticultural Instructor (Mr. G. Quinn) says—"The loquat may be budded on to the quince during the spring and summer when the sap of the quince is flowing sufficiently to permit the bark being lifted freely. The buds of the loquat must be dormant, that is, not sprouted from the axil of the leaf stalk. Use the ordinary shield bud and retain about half an inch of the leaf stalk upon the shield."

*These may not be ready until a little later, say, end of February, during some seasons.

"H.P.R.," Brighton, asks for information in regard to a disease affecting his plum trees.

Reply.—The Horticultural Instructor replies --"The leaves of your Jefferson plum are affected by the fungus called prune rust (*Puccinia pruni*). As a rule it attacks the foliage late in the season here and the plants do not seem to display effects sufficiently injurious to make it worth while combating the pest. The variegation on the apple tree leaves is not a serious matter, and if a good sprinkling, say 3lbs. or 4lbs. of pulverised sulphate of iron, be worked into the soil over the roots of each fully-grown tree during the present season of the year, you may expect it to gradually assume its normally green foliage as the summer proceeds."

"F.K.," "Borinya," Mooroopna North, Victoria, states that he is interested in olive-growing, and desires information as to treatment of berries and best varieties for a small grower.

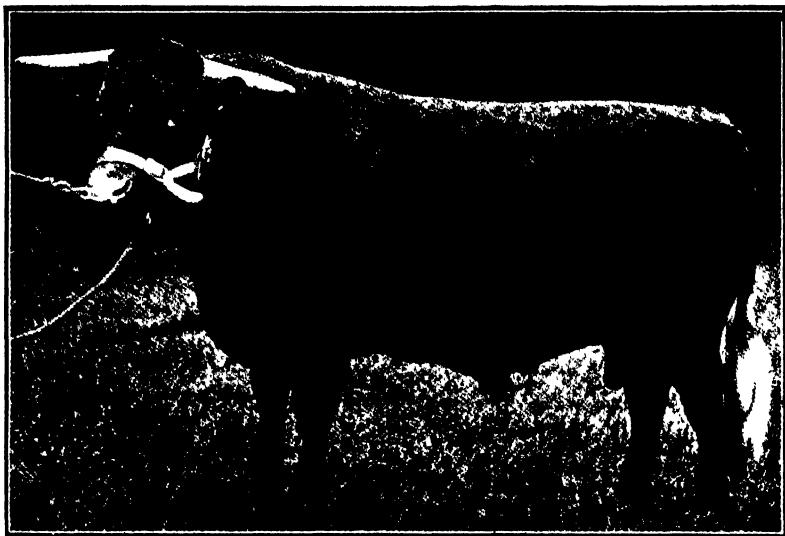
Reply The reply from the Horticultural Instructor is as follows: --The best makers agree the olive berries should be quite ripe before harvesting takes place. They should be crushed as soon as gathered, if possible, because, if piled up long, fermentation ensues and the flavor of the oil is affected. I do not know of any equipment specially designed for a small grower, but some kind of crusher is required that will pulverise the berries and their seeds. As metals are apt to taint the oil, most grinding mills are of stone, or steel kept very clean between periods of use. A small corn-crusher or a pair of old millstones might be adapted to the purpose. A screw press, such as is used by small winemakers, would do for pressing the pulped berries, which, after being crushed in the mill, are placed in small grass or open woven calico bags holding a few gallons each, and about a dozen of these are placed under the press. The juice which flows away contains water and vegetable matter besides oil, and in consequence it is passed into small tanks of water, and the oil after a time floats on top and is skimmed off. This is called the virgin or best quality oil. After the first pressing the pulp is dipped in hot water and again pressed, securing a second grade oil. A third pressing is sometimes applied to remove the third grade oil. The oil is subsequently filtered through cotton wool and stored in glazed earthenware or tinned vessels, if not bottled, and must be kept away from air, light, or high temperatures."

A FARMER'S COW.

THE ANIMAL FOR GENERAL UTILITY.

By F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

The very wise old saw has it that "Fools step in where angels fear to tread," and probably it applies to a vet. who talks about breeds of cows; but some excuse may be found for one that milked long before he knew how to drench,



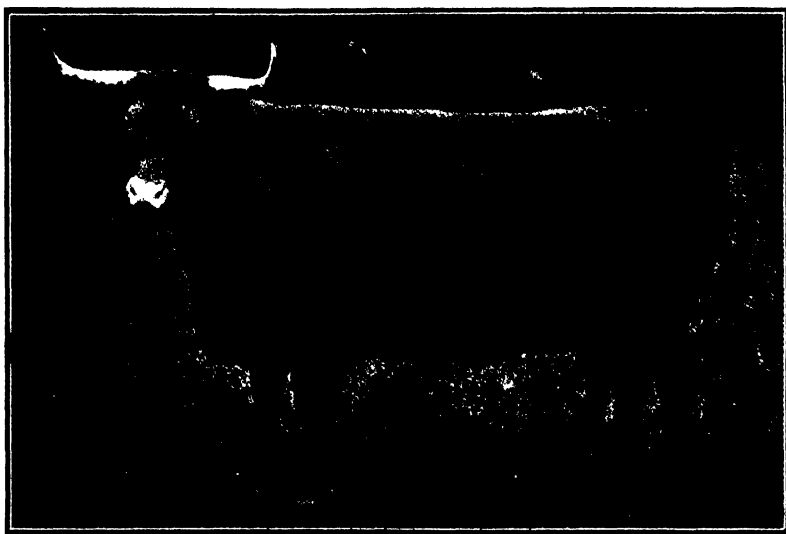
North Devon Bull, "Highfield Noble."
Champion, Royal Show, 1911.

to whom the cowshed was familiar before he became acquainted with the dissecting room, and to whom the art of dairying in South Australia is a mystery, the salient point about it being that he is certain that the average English dairy cow asked to do her duty under South Australian conditions would immediately adopt the tactics of the militants and go in for a hunger strike. Another point that he cannot settle in his own mind is whether it is altogether an advantage to look on the cow as a dairy animal only. The President of the Pinnaroo Branch of the Agricultural Bureau recently wrote a very convincing paper to prove that it was, showing that the general utility

cow was as dead as the dodo, and that the aim must be milk or nothing; and as the gentleman practices what he preaches, it may be temerity to butt up against him.

THE GENERAL UTILITY COW.

On the other hand, South Australia cannot by any means be described as a dairying country; it, like any other fertile land, has its dairy districts, differing as completely in their essential characteristics as the north from the south-east do geographically. And where the country suits, there one may with profit exploit the perfect milk machine; generally, however, the conditions require a general utility cow as much as they do a general utility man. And by a general utility cow one does not mean a Jersey-Shorthorn-Hereford-Ayrshire-Holstein plus X cross, the sort of animal that provides a couple of quarts of milk a day for a few weeks after calving, and then a few drops now and again if the parson should come in to tea, but a cow that will give a good flow of milk and keep it up under conditions that are not always those of the ideal



Devon Cow, "Pound Brassy 12th."

First Prize Royal Show, 1911.

dairy, and when her time comes will provide a carcass that the butcher who likes a good show in his shop will give an extra shilling a hundred for.

A couple of hundred years ago the Hereford filled the bill, and it is interesting reading to note the eulogies of men like Marshall, or Pickering, and Young, who readily give the pride of place to the Whitefaces, whose milking qualities to-day have entirely given way to beef—a striking proof of the power of selection. To those of us who have trod the valley of the Doones, and with bated breath have almost heard Carver's heavy tramp in "Badgery wood,"

there can be no other breed of real cattle than the Ruby Devons, which probably roamed on Exmoor, as pure a breed as they are to-day, long before Cæsar's farmer outposts were crossing their first cousins in Sussex with the big-framed cattle from the Flemish Flats. In the hills around Adelaide one often sees the ruby-red which Mendel tells us is a "dominant" color that speaks of forebears that probably went under the hammer in Barnstaple



South Devon Bull, "Primly Excelsior."



South Devon Cow, "Countess."

market, where to-day the butter and the clotted cream stand unrivalled in the world, products of a breed that no one would call a dairy breed, but which still suits those farmers and their wives, whose keenness at a bargain leave Jock and Sandy no chance to earn a bawbee on it.

The Devon is a living proof of the survival of the fittest, suiting its surroundings, hardy and compact on the bleak moorland, compact still, but

larger and heavier both in milk and meat on the lush marshes of Somerset, where the oft recurring hostel sign of "The Red Cow" side by side with "The Angel" or "The Salutation" seems to speak of that early Aryan religion which in Hindustan still places the red cow in the foremost rank of gods.

But should our travels take us by the "Cornish Riviera" express past the marshes of Starcross, the swelling bosoms of Mother Earth as Chudleigh climbs to Haldon, to the coombes that open out at Totnes into the valley of the Dart, the verdure of whose banks is lapped by the diamonds of the stream, we shall find our rubies of the moor larger in frame, lighter in color, slower in movement, heavier in milk. We are in the heart of the South Hams, where the soft, balmy air of moorland and sea fan to life pasture and feed, that rounds



Guernsey Cow, "Hayes Olive."

First Prize, Royal Show, 1911.

off asperities in tor or torrent, and turns the crisp English of "We had one of those, but it died" into "Uz ad one uv they, but im died ur did." And here some two hundred years ago the demand for butter and cream made breeders cull their beefier cows and select large frames, while the onion sellers from Brittany, whose own smooth tongue is easily understood in this land of soft vowels, told of the Guernsey, the yellow of whose cream well matches her coat. And soon to every dozen Devons was to be found one of the mild eyed Guernseys, whose offspring to a Devon bull were ugly ducklings indeed, razor-backed and gaunt, but the heifers soon grew into swans, large framed, silky-coated, on whose sleek sides the dapple of the yellow vied with the ruby of the red, till one would think the crimson russets of the orchard had been the tints on Nature's palette that she took to paint them with. They lost nought of the hardness of the Devon, but they gained the udder of the

Guernsey, while they evolved the frame of the South Hammer or South Devon, whose type is fixed, and whose qualities send her to South Africa and the Argentine in quickly increasing numbers, because her 600galls. or 700galls. of milk followed by her 7cwts. to 8cwts. of beef are maintained in those countries, while the steers she produces are among the primeest in the market. The hardiness of the Devon in her gives her practical immunity from disease such as tuberculosis, the mildness of the Guernsey does away with the need of a bail.

In New South Wales she has left her mark on the Illawarra, and in South Australia would soon replace many of those hopeless nondescripts that are not and never will be farmer's cows.

A FARMER'S MISTAKES.

LESSONS LEARNED.

The majority of persons are backward in admitting that they have made mistakes, and the number who are prepared to publicly recount their errors of judgment so that others may profit by their experience is limited. Mr. D. C. Maxwell, however, in a paper he recently read before the Mount Pleasant Branch of the Agricultural Bureau, proved his public-spiritedness in that particular, and his remarks are printed below, not alone for the high value of the advice given, but in the hope that other members of the Bureau may be induced to follow his good example. Mr. Maxwell said -

In reading an article in the Press referring to the twenty-fifth anniversary of the Agricultural Bureau, and the good work done by that organisation, I noticed the following:—"The younger generation particularly have a great deal to gain by associating themselves with the Bureau, for the information gleaned at the meetings will enable them largely to avoid the mistakes made by the pioneers, and confidently build upon their successes."

As I read this I thought it might be helpful to ourselves or to someone else if we made known a few mistakes we had made, so that others may avoid these at any rate. We do not like to talk about our mistakes; we are far more free in telling others of our successes, or in talking about the mistakes of our neighbors. It seems a trifle humiliating to have to confess that we

have made mistakes ; and yet it need not be, for the best of people make them more or less, and if the telling of a mistake hinders someone else from making that mistake, then surely it is a benefit to tell it.

Now, in this paper I intend to mention only mistakes made in carrying on the business of agriculture or general farming pursuits, and, as you are all aware, I am and always have been connected with others in this business, so that it needs to be " we " instead of " I " ; but, although I will have to say " we," I intend to stick to mistakes which have occurred in my experience and on our own farm.

I hardly know where to start, because as I look back I see a good many things which I know would have been better avoided, some of them big mistakes, others smaller. I think, however, I will begin with a big one, and one that goes back to the very beginning—the selection of land.

A number of years ago, as we had a very small farm, and as there was a family growing up, we looked around to see if there was some suitable land which we might get to help make a respectable living on. We got an offer of a quantity of land, unimproved and covered with dense scrub. The offer was that we should have a lease of the land for 10 years, pay a certain amount of rent, and fence and clear the land (grub the stumps clean out). We accepted it. That was where the mistake came in. We did the work ; the landlord reaped the benefit. The lesson learned from this mistake was—Never take an unimproved farm on lease unless it is a perpetual lease, or unless you have a prospect of making it your own some day. If you do, you may find when your lease is out that the farm is worth five times as much as it was when you took it and you are not much better off.

The second mistake I will mention is in regard to the kind of crops grown on the land. For a number of years about the only kind of crop we grew was wheat ; the only kind of hay we fed our horses on was wheaten hay ; the only kind of grain they got was wheat, either boiled, soaked, crushed, or in pollard or bran ; and the only kind of grain our fowls and pigs got was wheat. Now, I think this was a mistake. I think every farmer ought to grow other kinds of grain besides wheat. Of course, wheat ought to be the main crop, but other kinds should be grown in conjunction with it, and of these other kinds the most profitable, especially for the drier districts, are oats and barley. We find, especially in the hills, that, taking one year with another, oats will turn in nearly double the amount of hay per acre that wheat will ; that the horses relish the hay, especially if there is a small proportion of wheaten hay mixed with it ; that they are much stronger and healthier when fed on this kind of hay and oats or barley as grain food than they used to be when fed on wheaten hay and wheat fed as grain in any form ; and that the present day method of feeding is cheaper. We find also that our fowls and pigs do better on less expensive food if we give them a mixture of wheat, oats, and barley. The lesson learned here is—Don't confine yourself

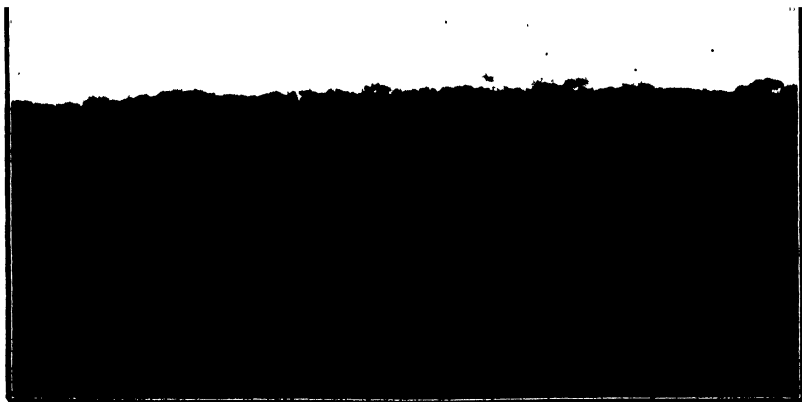
to growing only one kind of grain. At present we make a practice of growing three kinds. Perhaps some day we shall find that we have made a mistake in not growing more, such as peas, &c.

Another mistake we have made has been the method of treating the seed before sowing. I suppose you have all read Professor Perkins address on "Pickling Wheat," which he delivered at the Yorke Peninsula Conference. Well, from experience, I agree with him in what he had to say in regard to "floor pickling" or "dipping." In my earliest experiences of farming we used to pickle our wheat on a floor, and for many years I never knew what smut (ball smut) was. We got a notion, however, that to dip our wheat in a bluestone solution was easier and better than pickling on a floor: accordingly we adopted this method. It worked all right for a number of years because the seed as well as the land was free from smut; but one year, by some means there was a little smut in the crop, and for years afterwards we could not get rid of it. We got change of seed, seed that was free from smut, but still there would be some smut at harvest time. Some of our neighbors always pickled on floors and did not have smut, so we decided to try this method again, and I can assure you we have never had smut in our wheat since, and this was some years ago. We made a mistake in the opposite direction with oats. As you are well aware, Champion oats, and perhaps all kinds of white oats, are liable to have smut, and we always made a practice of pickling these. When we got Calcutta oats we did the same with them, but we have found since that we made a mistake in doing so, as they do not seem to be liable to smut, and to pickle them not only means extra trouble, but they will not run through the drill as freely nor as evenly after being wet, consequently there is not such a good crop at harvest time. The lessons learned on this point is—Always pickle wheat on a floor, and do not pickle Calcutta or Algerian oats at all.

A further mistake I may mention here is that of demolishing shelter for stock. Thirteen years ago nearly all the paddocks on our farm in the hills had some furze hedge around or partially around them. After the great fire in 1901 we grubbed out all these hedges. I have come to the conclusion that this was a mistake. I admit that furze hedges are very bad for leading a fire along if one happens to be in the vicinity, and they are also a harbor for rabbits if they are not attended to; but there is no necessity to have any great quantity of them. If a short piece had been left at the south-west corner of each paddock in which horses or cattle are kept it would, in my judgment, have been an advantage. In this district stock will do very much better if they are provided with shelter, and the best shelter that you can have against cold winds is furze. The most of our cold winds come from the west or south, so I think that if a piece of hedge (say a chain or two each way in the south-west corner of a paddock) is grown it will prove of great benefit to the stock during the cold winter months.

The next mistake that comes into my mind is that of neglecting to have a proper water supply on the farm. For a great number of years we used to have to drive our stock about a mile to water part of each year (this was when we lived on the farm near Springton). When we removed from there to where we are living at present necessity compelled us to provide water on the farm, so we put in four days with two teams scooping out a dam. We finished the job on the Saturday, the dam got full on the following Tuesday, and it has never been empty since. If we had done this years before it would have meant pounds in our pockets. Then at our farm on the flats, again, we have done a good lot of water-carting in dry years; instead of which we should have put down a well or bore, or made tanks to conserve the surface water, and by so doing we should have saved many a day's work with a team.

I could go on relating many more mistakes if necessary, but I think I had better leave off here in case you think that it has been all mistakes and nothing else. The Secretary of the Advisory Board, in his suggestions for working in the Branches of the Bureau (May number of *Journal*, pages 1129 to 1134) says that the primary object of the Bureau is the dissemination of knowledge amongst the members, and, because as much is learned from failures as from successes, a man should never hesitate to relate his mistakes, as others present at the meeting may have made a similar one, while others again may know how to remedy it. In this paper I have followed the heading, viz., "Mistakes Made and Lessons Learned," so that apparently I have found the remedy for the mistakes which I have cited; but perhaps we are making mistakes at the present time for which we have not found a remedy, and if it is thought advisable at some future meeting to have a discussion on these I shall be most happy to participate.



Wheat Crop and Virgin Land, Pinnaroo.

SHEEP ON THE FARM.

By HENSHAW JACKSON, Wool Expert S.A. School of Mines and Industries.

BRITISH BREEDS.

Under this head I propose to speak of those sheep which are found to-day in England, Scotland, and Ireland under conditions of general agriculture, and while noting all the varieties for the sake of information, will only specifically deal with those breeds which are familiar to us by reason of their importation and use amongst our own farmers. In this connection it may here be noted that, while we can claim the Australian Merino as an exclusive product due to the energy and skill of Australian sheep breeders, we cannot, except perhaps as regards the Romney Marsh, in New Zealand, presume to say that we have differentiated so far as to cause any of the British breeds to become essentially Australian in character or type. So far as we have gone with these sheep we adhere to British standards, and the importations we continue to make are of the sort which tend to maintain those standards. Any differences between the British sheep bred in Australia and those reared in their native land are mainly those which are due to the influence of soil and climate and not to any attempt on our part to alter the character or type of the animals by experiments of our own.

Perhaps the time will come when Australian breeders of British sheep will be able to wholly depend upon their own flocks for sustaining the character and type of the adopted varieties on as high a plane as is the case to-day with our Merinos, or it may be that an entirely new type of sheep as, for instance, the Corriedale and other evolved breeds which are the result of a fusion of English Longwool and Merino blood will become the "farm sheep" of the future. Such a consummation, however, is not to be expected in the comparatively short period during which we have been using the British sheep, and while there are, no doubt, skilful and scientific breeders who will ultimately reach the desired goal, we shall continue for some time to come to avail ourselves of the good work of the English breeders, who may still expect to find a fair demand at this end of the world for their best specimens of the different British breeds we may think desirable and suited to our requirements.

CLASSIFICATION.

The divisions into which British sheep are placed are mainly two, viz., Longwool and Shortwool, and the different types as they exist to-day may be enumerated as follows :--

Longwools.--Lincoln, Leicester, Cotswold, Romney Marsh, Devon Longwool, Roscommon (Irish), Wensleydale.

Shortwools or Downs.--Southdown, Shropshire, Suffolk, Old Ryeland, New Ryeland, Hampshire, Oxford, Dorset Horn.

These two divisions include the types or varieties of sheep most generally known in connection with British and Australian agriculture and sheep-farming, but there are those which occupy a prominent place in their own districts that must be mentioned in order to make our classification complete. These are as under --

Forest or Mountain Breeds.--Cheviot, Blackface (Scotch), Herdwick, Lonk, Limestone or Crag, Dartmoor, Exmoor, Clun Forest, Tanface, Kerry Hill, Welsh Mountain.

The above classification practically covers the ground excepting a few sub-varieties which are of no great concern.

The under-noted points are those which are in a general sense applicable to most British breeds of sheep and which it is desirable to set down for information and reference --

(a) A graceful carriage and springy style of walking.

(b) A characteristic head with good depth and strength of jaw and breadth across the bridge of the nose, and full bright eyes, indicating both docility and courage.

(c) The neck thick towards the trunk, tapering to the head, arching slightly, and not too short.

(d) The chest broad, deep, and projecting well over the forelegs, and descending perpendicularly from the neck.

(e) The back level and broad behind and before (except in the Cheviot and Lonk breeds, which have sharp shoulder tops or withers) with a uniform covering of flesh, not boggy, but firm and muscular to the touch ; under and upper lines straight.

(b) The ribs well sprung, rounded, and deep.

(g) The shoulders well laid and covered with firm flesh ; the regions immediately behind the shoulders filled up.

(h) The thighs and gigots (legs of mutton) and also the arms and the fore flanks fleshed well down.

(i) The rump, or part near the dock, well developed, though not too large, as is sometimes the case in Cotswolds, Border-Leicesters, and other heavy-fleshed breeds.

(j) The quarters long and not drooping behind, and the spaces between them and the last ribs short.

(k) The legs straight and set well apart, not too long ; the bone clean and fine, and neither coarse nor deficient ; the hocks are much better slightly out than at all in or "cow hocked."

(l) The characteristic wool of the special breed covering well the body, and particularly the belly ; also the scrotum of the ram.—(*Wallace.*)

(*To be continued.*)



SHEEP-FARMING IN GREAT BRITAIN.

The following article taken from *The Field* clearly shows the value of sheep in British agriculture, and points very plainly to the potentiality of the animal if properly handled in relation to farming in South Australia : —

The value of the pastoral industry to Great Britain is not adequately appreciated. Not only is there no other country in which it has been raised to anything like the same standard of intensity and success, but it is one of the largest contributory sources to the gross agricultural revenue of the country. The capital represented in sheep is second only to that in cattle, and mutton and wool realise annually upwards of £20,000,000. The importance of the business to the nation, however, cannot be estimated on a statistical basis alone. The great value of sheep is that they enable extensive areas to be turned to commercial use that otherwise would be worthless in an agricultural sense. In a few districts sheep are kept in preference to other stock as a matter of choice, but, speaking generally, their owners have no alternative. Whether we take the thin chalk soils of the southern counties, the marshes of Kent, the intermediate altitudes of the west midlands, or the extensive mountain ranges in the northern counties in Wales, or in Scotland, we find sheep in unchallenged possession of territory on which other classes of stock could scarcely subsist, and in which, but for them, farming in any form would be impracticable. The country owns no more useful or valuable possession than its breeds of sheep, which, numbering nearly 30, are each distinguished by some characteristic that gives to it peculiar aptitude to thrive in its own locality. The very multiplicity of the varieties testifies to the intelligence with which the industry has been cultivated, and breeds evolved suitable to diversity of climate and soil. We are so accustomed to the enlightened form which sheep-farming in this country has assumed that we do not properly appraise either its value or the skill that brought it to its present state of perfection. The discovery

of these things has been left to visitors from abroad, who have been induced to make comparisons between their own methods and those in the Old Country. Their amazement has found expression in various ways. They are almost incredulous that there should be as many as 27,000,000 sheep in Great Britain, or nearly a sheep for every acre of land under crop or grass. An extensive sheepowner from Queensland recently expressed astonishment to find that in so small a country as this, noted both for its arable farming and cattle-raising, should, in addition, possess a larger aggregate of sheep than existed in the whole of Queensland. Others, at Home and abroad, who have only just realised the place that sheep occupy in the agricultural economy of Great Britain, are equally impressed by the discovery, and are beginning to think that after all British farmers have not drifted in the hopeless manner so often represented by speakers and writers imperfectly informed on the subject. Sheep-farming has long been a central pillar in the agriculture of this country. The adaptability of the sheep is shown by the diversity of practice that obtains in its management and the ready response it gives in mutton or in wool to the particular objects of its owners. The farmer possesses no more pliant an animal, and a great point in its favor is that it is not only a source of direct profit, but that indirectly it is a valuable agent in fertilising the soil, converting poor land into rich, and making waste places to contribute liberally to the needs of the nation.



Shearing.

EXTRACT FROM TRADE COMMISSIONER'S REPORT.

The following is an extract from the report of the Trade Commissioner on the Middlesbrough Exhibition : -

The Grocers' Exhibition was opened in Middlesbrough on the 15th April, and remained opened until the 26th.

The opening ceremony was performed by the mayor of the town, who, during his speech, made several very flattering remarks in regard to the colonies generally.

The South Australian exhibit occupied a space of 50ft. by 14ft., and in this connection I do not think I can do better than quote from the *Northern Echo* of the 16th April - "There cannot be two minds about the fact that the greatest interest of the public centred around the superb stand of the South Australian Government, which is under the supervision of Major A. E. M. Norton. There were assembled in the most artistic style the products of that vast and fertile part of the British Empire. Here may be inspected the famous Australian wines, which gained 11 prizes at the last Brewers' Exhibition. Dried fruits of every description are on view, including large numbers of different brands of currants, along with specimens of wheat, barley, and other agricultural products of this resourceful country." Again, the *Northern Star* of the 26th April states - "During the run of the exhibition it has met with phenomenal success. The display of produce from fertile Australia will be long in the minds of the visitors, and for the arrangements of the display the highest praise is due to Major A. E. M. Norton (the Trade Commissioner), who loses no point in bringing before the public notice such produce as may be purchased in the town of Middlesbrough and districts."

Attendance.—On inquiring from the management, I learn that the attendance exceeded 60,000 during the 11 days the exhibition was open. While in Middlesbrough we succeeded in getting 19 of the leading grocers to stock South Australian produce, including such lines as honey, eucalyptus oil, apples, dried apricots, sheeps' tongues, boiled and corned meats, fresh fruit, wines, and tomato sauce.

Included in the 19 grocers there is one firm in particular, who are amongst the largest retail grocers in the North of England, and in addition to their retail trade they carry on a considerable wholesale business. They have taken a keen interest from an imperialistic standpoint in our produce, and have promised to push it wherever they possibly can. I think it is worth while mentioning the fact that prior to the exhibition, South Australian produce (excepting butter) was not known in the town or district.

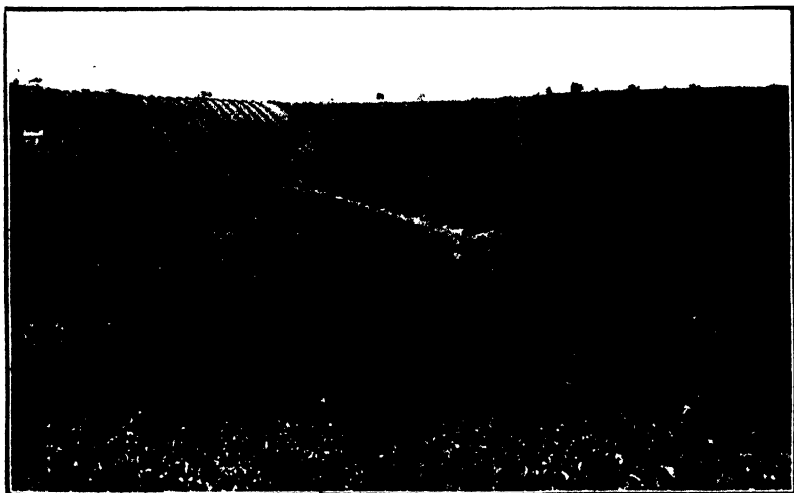
I may say that this exhibition has been a most valuable means of introducing our produce to this all-important and busy centre.

Writing under date, London, May 23rd, the Trade Commissioner states—

Butter.—As far as Australian butter is concerned, there is practically no first quality on the market, therefore, any quotations that one might give would only be quite nominal. There is, however, still a heavy supply of secondary quality butter in the cold stores for which no reasonable offer is being refused. The prices that I hear have been taken range from 90s. to 96s.

Shop Window Display. On Friday night last I proceeded to Edinburgh in order to meet the Hon. the Premier and party, and returned to London on Sunday night. During my stay in Edinburgh I arranged to have a large shop window display some time in June. This method of advertising our products in Edinburgh has proved very successful in furthering the sale of our produce in that city.

— 575105 —



Vineyards, Near Adelaide.

LIVE STOCK RETURNS.

STATISTICS FOR 1912.

The Government Statist (Mr. L. H. Sholl, C.M.G.) has issued his report on the final results of live stock statistics for the year ended December 31st, 1912. Included in the particulars given are the following :—

STRENGTH OF FLOCKS.

Cattle.—383,418 (393,566) ; decrease, 10,148. Within the counties cattle decreased 22,294, but in the outside country the herds were increased to the extent of 12,146.

Horses.—276,539 (259,719) ; increase, 16,820.

Sheep.—The lambing season was very unfavorable, 961,895 lambs were marked against 1,530,774 the previous year, a decrease of 37 per cent. Notwithstanding the low natural increase and the increased mortality through drought and wild dogs, the reported slaughterings were as heavy as usual. The result is that the flocks show the substantial decrease of 690,418 on the previous year, the total number being 5,481,489 against 6,171,907. Within counties, 4,486,644 (5,090,380) ; decrease, 603,736 ; and in the Far Northern and Western areas outside of counties, 994,845 (1,081,527) ; decrease, 86,682.

Pigs.—69,832 (93,130) ; decrease, 23,298. Though the total at the end of the year shows a heavy decrease on the previous year, the production during the year was equal to providing for the slaughtering of 84,992 (88,170), a decrease of only 3,178. Of the number slaughtered 45,591 were used in producing 3,771,064lbs. bacon and ham.

Goats.—11,862 (13,728) ; decrease 1,866. Of this number 3,103 (3,218) were described by the owners as Angora.

Other Stock.—7,287 (6,617) ; increase, 670. The following are included under this heading :—Camels, 3,199 (2,761) ; mules, 801 (780) ; donkeys, 1,912 (1,772) ; ostriches, 1,345 (1,304).

SLAUGHTERINGS.

For home consumption and exports—

Sheep and Lambs, 1,329,763 (1,272,400) ; *cattle*, 112,109 (86,367) ; *pigs*, 84,792 (88,170). In addition, the following were slaughtered and boiled down :—*Sheep and lambs*, 3,075 (3,334) ; *cattle*, 1,235 (926) ; *pigs*, 200.

STOCK PER SQUARE MILE IN EACH DIVISION, 1912.

Division of State.	Area in Square Miles.	Cattle per Square Mile	Horses per Square Mile	Sheep per Square Mile	*All Kinds in Terms of Sheep per Square Mile.
Central	13,891	6.72	7.61	73.53	216.79
Lower North.....	12,401	3.45	4.92	76.15	159.81
Upper North.....	14,065	4.52	2.17	50.42	117.33
South-Eastern.....	15,585	3.21	2.32	81.48	136.80
Western	26,161	.52	.91	20.71	34.99
Outside Counties ...	297,967	.40	.07	3.34	8.02
Total South { 1912 }	380,070	{ 1.01	.73	14.42	31.79
Australia { 1911 }		{ 1.04	.68	16.24	33.43

*For this purpose each horse or head of cattle equals 10 sheep.

DAIRYING.

Notwithstanding the exceptionally dry year the dairying industry was fairly well maintained. The total number of cows (in milk and dry) numbered 114,734 (121,803), a decrease of 7,069. The Central division is responsible for 4,096 of this decrease. The cows actually in milk at the end of the year numbered 79,325, or 333 more than for the same period for the previous year. The production on farms and in factories for 1912 was as follows:—

Butter.—8,270,559lbs. (9,694,666lbs.); decrease, 1,424,107lbs.

Cheese.—1,958,027lbs. (1,526,930lbs.); increase, 431,097lbs.

Bacon and Ham.—3,771,064lbs. (4,311,497lbs.); decrease, 540,433lbs.

Of the total quantity of butter made, 3,585,269lbs. (3,671,649lbs.) were made on the farms and 4,685,290lbs. (6,023,017lbs.) in factories.

Year.	Production.		
	Butter.	Cheese.	Bacon and Ham.
	Lbs.	Lbs.	Lbs.
1908	8,130,560	1,556,894	3,392,162
1909	8,482,168	1,578,378	3,348,050
1910	10,717,486	1,796,281	3,741,942
1911	9,694,666	1,526,930	4,311,497
1912	8,270,559	1,958,027	3,771,064

VALUE OF PASTORAL EXPORTS.

The value of the exports of pastoral products—animals living, meat (frozen, &c.), skins and hides, tallow, wool, &c.—to countries beyond the Commonwealth States for the last five years is as follows:—

1908, £1,973,977; 1909, £2,401,304; 1910, £2,720,783; 1911, £2,571,660; and 1912, £2,685,321.

DISEASES OF FARM ANIMALS.

DIGESTIVE AILMENTS OF CATTLE.

By R. H. F. MACINDOE, L.V.Sc., Assistant Veterinary Surgeon Stock Department.

(Continued from page 1252.)

IMPACTION OF THE RUMEN.

This term designates the filling of the first section of the stomach (the paunch) with an excessive amount of food, which will diminish or abolish entirely the functions of that organ.

Causes.—The disease is common in Australia, more particularly during dry periods when animals have to rely mainly on dry foods, more especially if they are of a coarse, innutritious nature. The condition is also found when animals receive large quantities of succulent and palatable food, for which reason the greedy feeder is most prone to suffer. The actual impaction is brought about by the overtaking of the muscular walls of the stomach, causing them to become distended, whereby they cannot perform their natural functions of mixing and moving the food, with the result that a paralysis of the rumen (paunch) supervenes. Predisposing causes are physical weakness, over exertion, fasting for some time before feeding, and sudden changes from green to dry food.

Symptoms.—The animal as a rule refuses food, ceases to chew the cud, and stands in one position with the back arched and legs under the belly or spread apart. Occasionally colicky pains are shown, by kicking at the belly, moaning, and turning the head round towards the left flank. These colicky pains, though usually not severe, are seldom absent. Now and then the animal lies down, but soon gets up again. In mild cases the appetite and chewing of the cud are not entirely lost, but in severe cases they are absent from the commencement of the attack.

The rumen (paunch), which is found on the left side, can be felt distended with food, and on examination has a doughy feel; pressure with the fingers leaves their impression for some little time afterwards. In some case the contents of the organ are quite firm and hard. At first the dung is passed

at normal intervals, but later constipation occurs, and the dung is firm, dry, and of a dark color. The breathing may be disturbed and labored, on account of the pressure of the distended stomach.

Treatment.—The essential factor in the prevention of this common disease is attention to the food, and by regulating its quality and quantity. Where cattle are receiving food of a low nutritive value such as straw, cocky chaff, etc., the addition of concentrated foodstuffs such as copra cake, molasses, pollard, bran, crushed grain, &c., is to be recommended. A purgative drench such as the following, Epsom salts, 1lb. ; powdered ginger, 2ozs. ; powdered carbonate of ammonia, 1oz., should be given with a cupful of treacle in a quart of water. This may be followed by stimulants such as carbonate of ammonia in $\frac{1}{2}$ oz. doses two or three times a day, well diluted with treacle and water.

GASTRO-ENTERITIS.

This disease embraces all the inflammatory processes which affect the stomach and intestines. Generally both are affected at the one time. It follows upon irritations more severe and longer continued than those which produce gastro-intestinal catarrh. The disease often follows as a result of other diseases, but for the purpose of this article only the form caused by some acute irritant will be dealt with.

Causes.—Continued feeding on badly-preserved forage—especially rusty hay—exposure to cold, drinking water contaminated by filth, poisoning by acids, corrosive drugs—such as phosphorus, arsenic, lead, and mercury—the licking of lead paints, &c.

Symptoms.—There is loss of appetite, and chewing of the cud ceases. The animal is dull, and the muzzle dry. Thirst is very much increased. Colicky pains are frequent and often intense in character, and the belly is sensitive to pressure. Often affected animals are bloated. Later there is extreme prostration, accompanied by an increase of temperature.

At first the dung is hard, though often coated with mucus or blood, but later profuse diarrhoea sets in, often bloodstained and having an offensive smell. This disease is very fatal unless taken in hand early, and recovery is very slow.

Treatment.—If due to defective food, the removal of the bowel contents should be brought about by the administration of laxatives such as castor or linseed oil. If the pain is severe, powdered opium one to two drams every three or four hours in warm gruel. To check the diarrhoea the following remedies are useful :—Tannin, prepared chalk, starch, given in warm flour gruel with powdered opium. Allow only small quantities of water with the chill taken off, or preferably linseed tea to drink.

In the case of poisons, a suitable antidote is indicated. For instance, in the case of acids, large doses of carbonate of soda or any other alkali should be given.

DISEASES OF THE CIRCULATORY SYSTEM—CATTLE.

(See article on Circulatory System in *Journal of Agriculture* for March, 1912.)

Under this heading come such diseases as inflammation of the heart and its sac, inflammation of the veins and arteries, the formation of clots in the vessels, &c. The only disease commonly met with in cattle is —

INFLAMMATION OF THE HEART,

due to the penetration of foreign bodies. Cows are often addicted to chewing articles not intended for food, and in this way often swallow foreign bodies, such as nails, hairpins. Sharp-pointed articles, such as pins, nails, &c., may accidentally drop into the feed, and in this way reach the stomach. When sharp-pointed bodies reach the stomach they often penetrate its wall—usually that of the second stomach—pass through the diaphragm (the partition between the chest cavity and the belly), and pierce the heart. The passage of the foreign body is helped by the movements of the chest in breathing.

Symptoms.—The animal is inclined to move cautiously, sudden movement causes grunting. Sometimes there are soft swellings beneath the neck or between the fore legs. The breathing is short and painful, and may be accompanied by a cough.

Treatment is useless.

RESPIRATORY DISEASES OF CATTLE.

This includes diseases affecting the nasal cavity (nostrils), larynx (throat), the trachea (windpipe), the bronchi (tubes), and the lungs.

NASAL CATARRH.

Inflammation of the lining membrane of the nostril and upper air passages. By itself it is not serious, but if neglected is liable to become complicated with laryngitis and other diseases of the respiratory organs.

Causes.—Sudden exposure to wet and cold. Inhalation of irritating gases.

Symptoms.—Redness of the lining membrane of the nose and watering of the eyes. This is followed by a discharge from the nose, which later becomes turbid or yellow. The animal is dull and listless, and the appetite is poor.

Treatment.—Place animal in a clean, well-ventilated place. If the weather is cold, rug the animal. Give inhalation of steam medicated with eucalyptus or turpentine. When fever is present give a dessertspoonful of nitrate of potash in the drinking water twice daily. Tempt the appetite with good, nutritious fodder.

LARYNGITIS.

This disease is commonly known as sore throat.

Causes.—Same as nasal catarrh.

Symptoms.—Elevation of temperature, pain on pressure to throat, moist cough and noisy breathing, marked difficulty in swallowing.

Treatment.—Medicines given should be in the form of pastes smeared on the tongue. The following is of value :—Chlorate of potash, 2oz.; fluid extract of belladonna, $\frac{1}{2}$ oz.; powdered opium, $\frac{1}{4}$ oz.; powdered liquorice root, 2ozs.; treacle sufficient to make a paste. Place a tablespoonful of this mixture on the tongue two or three times daily. In some cases a little turpentine linament may be applied to the throat. Allow soft food, mashies, etc., which can be easily swallowed.

BRONCHITIS.

Generally the result of what is known as “catching a cold.” May also be the result of spreading of a catarrh from the throat and nose. It is an inflammation of the tubes forming the branches of the windpipe (bronchial tubes). It may be caused by inhaling irritating gases, or by the entrance of medicine into the windpipe in drenching.

Symptoms.—Loss of appetite, elevation of temperature up to 104°F. or 105°F. The indrawn breath is short and painful, and the expulsion of air is prolonged. A characteristic cough is present, which is painful, sudden, and incomplete. By placing the ear to the side of the chest a peculiar sound may be heard, resembling the breathing of a person suffering from asthma. Later these sounds may cease, due to the plugging of the tubes. In some cases the disease spreads to the lungs and results in the condition known as broncho-pneumonia.

Treatment.—Place the animal in a clean, well-ventilated box. Keep the bowels open with mild laxative such as small doses of Epsom salts or sulphate of soda. Keep the body warm by rugging if necessary. The diet should be light and nutritious. The following draught may be given :—Extract of belladonna, 2 drams; solution of acetate of ammonia, 4ozs. Give in half a pint of water three times a day. Or spirits of nitrous ether, 1oz.; aromatic spirits of ammonia, 1oz.; powdered camphor, 2 drams. Give in a pint of linseed tea three times a day.



Camel Team, Oodnadatta.

FOREST TREE-PLANTING.

THE PREPARATION OF THE LAND.

By the CONSERVATOR OF FORESTS (W. GILL, F.L.S., F.R.H.S.).

One of the questions to which the agriculturists of the State are devoting increased attention is that of afforestation. In view therefore of the fact that June and July are the best months for planting pines and deciduous trees, it has been thought that the paper on "Land and Its Treatment for Forest Tree-planting," printed below, which was prepared by the Conservator of Forests (Mr. W. Gill, F.L.S., F.R.H.S.), and read by him at the inter-State Conference of Forestry held in New South Wales in 1911, should prove of special interest. It should be noted that owing to the injury which young gums are subjected to from frost, it is unadvisable that they, as regards most parts of the State, should be planted out until September. Mr. Gill's paper is as follows :—

The first thing demanding attention in planting forest trees is the state of the subsoil. This is of even greater importance than the state of the soil in a country like this, which, in the trying months of dry summer heat, with the dessicating north winds so frequently occurring, taxes the capacity of the soil moisture to the utmost. Forest trees do not need rich soil, generally speaking, but they must have a suitable subsoil able to retain ample moisture, or they cannot possibly thrive; hence it is that many a piece of land which will grow rank crops of cereals or wild oats and grasses fail to grow trees, simply because there is no retaining subsoil. As long as the cool winter and early spring time prevail the grasses and cereal can grow luxuriantly, and when the soil moisture gradually becomes exhausted in supplying the constant drain made upon it by their rank growth, it is time for them to begin ripening off in the usual order of their maturity. The drying of the soil, therefore, merely aids this process without producing any injurious effect, as by the time it cracks and opens out through loss of moisture the crop is off, and does not want any further assistance. It is just the opposite with trees, most of which make very little growth—some none at all—during the cooler months, when crops grow fast. When the approach of spring, however, warms up the ground they begin to grow apace, and the warmer the ground gets the greater is its loss of moisture in many cases, and the

sooner does it open out in cracks, which speedily end the life of any rootlets which, forming at the extremities of the main roots, attempt to extend the tree's root system. Thus it is that just when the tree requires the moisture the ground cannot give it, because it has no retaining bottom.

Surprise has sometimes been expressed at the strong growth of grasses, &c., in plantations where trees possibly have grown indifferently, and it has been considered that what would grow such grasses would also grow trees equally well; but that by no means follows, as may readily be concluded from the foregoing statements.

In considering the question of tree-planting it is frequently overlooked that, whilst some cereals and other plants of annual growth mainly get their nourishment from the surface soil, trees, as a rule, only live on the surface soil for a time, and soon find their way into the subsoil, and from that subsequently obtain their main sustenance. When this is borne in mind the great importance of selecting land for tree-planting with a good subsoil is at once apparent. If a surface soil is poor it can be enriched, but if a subsoil be bad it can never be changed for a good one. The recognition of this fact will save many a disappointment. It is the good subsoil that backs the tree up in time of drought, therefore only places where a good subsoil is to be secured should be planted with forest trees in any part of this country where testing heat conditions and a limited rainfall prevail. Neglect in this matter means sure death to the trees in drought times, no matter how well and for how many years they may grow promisingly in good times.

The possibility of growing trees on a limestone subsoil depends on the amount of annual rainfall. If this be heavy and reliable they may grow to fair size, but if light, then only shrubby growth, or "scrub" as it is termed, will result, because the limestone, being too porous, allows the rain to drain away too quickly. A good clay subsoil, on the other hand, retains the moisture, and when the tree is driven, under the powerful evaporating influence of our summer sun, to draw upon the subsoil to sustain its daily evaporation of moisture, the supply is there to answer the demand, whereas in the limestone bottom it has gone.

CULTIVATION OF LAND ESSENTIAL.

Assuming that a suitable site has been selected, the importance of cultivation of the land can hardly be over-estimated. Stiff soils, not being open enough, do not absorb enough moisture in this country unless they are previously cultivated. Ploughing breaks them open in such a way as to admit the rains that fall and the dews that are precipitated, and stores them for the future needs of the trees. Another advantage secured by ploughing is that the various forms of surface vegetation are thereby severely checked, and often totally destroyed, for the first season, and thus prevented from competing with the trees in a way that is ruinously exhaustive to their growth. Cultivation

also greatly facilitates uniformity of distribution in connection with the movements of the soil moisture, and thus largely prevents the injurious water-logging of the soil, where the trees are planted when holes are simply dug without any breaking of the surrounding ground, and, in addition to this, it sweetens and aerates the soil in a way that is **always** beneficial. There are some who, in all good faith, regard cultivation as unnecessary, and sometimes those who champion the cause of cultivation are obliged to dispense with it owing to circumstances beyond their control. It is admitted that some exceptions may be found, but a comparison between the results usually attained on land without previous cultivation, and on land sufficiently cultivated, will attest beyond any chance of dispute the great advantage to be derived from attention to this most important point.

THE TIME TO PLOUGH.

The time to plough requires careful consideration, according to the local conditions usually prevailing. Some soils plough better dry than moist. These should be ploughed prior to the first autumn rains—whenever they can be usually anticipated—and then a good supply of moisture will be secured for the future planting, and the annoying delays so often experienced in trying to catch the land just right in condition after rain will be avoided, and a cloddy surface of hard clumpers will be prevented. Soils of the stiff-clay loam type cannot be ploughed till a good rainfall has occurred. Nothing less than 2in. will suffice to make them soft enough after a dry, hot summer to plough up properly; no matter how strong the draught power, or how good the stock, whether horses or bullocks, the plough will not “look” at it, and that ends it. But as early as possible after the first good autumn rain the ploughing should start, as the more rain the land gets after it is ploughed the better is the store of moisture for the trees, and the stronger and quicker they will grow. Light sandy lands can be ploughed practically at any time, so that it is just a question of doing it at the most convenient time to fit in with other work, provided, however—and this is a vital matter—that between the time of ploughing and planting no introduced weeds or natural vegetation grow up, as if they do it just means ploughing over again, and thus incurring double cost. It frequently happens, however, that no growth takes place on sandy lands; but this is a matter of local knowledge of which those resident on the land to be treated will be doubtless duly aware.

The character of the implements used in cultivation of the land has a very important bearing both on the progress of the work and its ultimate results. It is seldom that any tract of land of fair size is all readily cultivable—portions will usually occur somewhat stony in character and rough enough to render ploughing with the ordinary fixed plough undesirable, on account of the risk of injury to the ploughman, and also to the extra cost in breakage

of shares and possible straining of the plough. The stump-jump plough therefore is in every way preferable ; and though the work it does is not so good from a prize-ploughing standpoint, it is really better for planting purposes, as very even ploughing sometimes sets down very hard in certain lands, whereas the rougher ploughing of the stump-jumper weathers down better, keeps looser, and absorbs rain better, while at the same time affording a certain amount of shelter to the small trees in their earlier state.

South Australia is the home of the stump-jump plough, as it was invented by a South Australian. There are several different makers, all on the same general principle, which directly the share touches any fixed obstacle admits of the section carrying it being lifted or jumped clear of the stone or root, after which it returns to its original position. These ploughs are now lighter in draught than formerly, being largely made of steel, instead of the heavy iron of 20 years ago. They have done admirable work all over the States, and are specially adapted for cultivating where any rough, stony, or stumpy land occurs.

There are circumstances, however, under which the ordinary stump-jumper is not so well adapted for ploughing for planting as the more recent disc jumping-plough. In the "mallee" country, where the ordinary stump-jumper does such yeoman's service, the "root," so called, is really more of a prostrate stem, and bulky, similar to a stone in shape, and against this the plough strikes and jumps right enough ; but in country which has been heavily timbered, the action is different where the trees felled and burnt off have been either manna gum (*Eucalyptus viminalis*) or stringybark (*Eucalyptus obliqua*). The roots from the stumps of these trees run along under the ground only a slight depth from the surface, to which their course is usually parallel. The result is that the plough constantly gets caught or hung under these roots. The stump-jump disc plough, on the other hand, never acts so, as the disc is both share and wheel combined in one, and as its action is a continuously revolving one it cannot get underhung by any root. Certain tracts of country carry a peculiar class of vegetation, such as ferns (*Pteris australis*), white-flowering ti-tree, so-called (*Leptospermum scoparium*), and several species of hakea, banksia, acacia, styphelia, and other dwarf heath-like wiry shrubs, which retard ordinary cultivation considerably. It is here that the disc plough specially shines, as it literally "carves" its way through the ferns and wiry roots of the various shrubs and cuts them up in a way that no other implement does. As regards the depth for ploughing, the normal standard has generally been 6in., or as near as existing conditions permitted, and satisfactory results have been invariably secured in this way. Additional cultivation would undoubtedly prove advantageous, but in dealing with extensive plantations the cost of such additional operations usually proves a barrier.

Cultivation of the land for cereals for a year or two previous to planting has been advocated by some, and there are special soils where it may be helpful; but in most land such practices have proved disastrous, as the trees require the virgin strength of the soil to get a good start, and never do so well if planted after much previous cultivation. Moreover, the strong growth of weeds, thistles, stinkwort, cockspur, &c., that always results from prior cultivation, in most instances invariably fights with the trees for existence, and is often but too successful in outgrowing and destroying them.

Ironstone and heathy country, however, may sometimes benefit by prior cultivation, as little or no growth of any weeds or plants ever occurs on such land for a year or two, and the first year's ploughing is often not so effective as with other soils. This is due to the fact that the rough, shrubby vegetation growing thereon holds the soil together a good deal by its numerous wiry roots, binding it into a kind of turf, and thus prevents it from breaking down as readily as other land does with one ploughing. Under these circumstances more frequent cultivation than is usually needed may be justified by the better soil conditions secured.

AGRICULTURAL EDUCATION IN PRUSSIA.

A DIVERSIFIED SYSTEM.

In view of the awakening of interest in South Australia in the subject of agricultural education the following article dealing with the system in Prussia, reprinted from *The Journal of the Board of Agriculture*, should prove of interest :-

The development and present position in Prussia of what we in this country are beginning to call Farm Institute work is not a little complicated by its connection on the one hand with continuation schools, and on the other with secondary schools.

Lower agricultural education began at a much later date than was the case with education of University rank. Its beginnings may be traced in the middle of last century in the foundation, both by private individuals and public bodies, of agricultural schools in which stress was laid on the practical side of the education given. It is a curious fact, however, that, with the progress of time, these schools have become more and more theoretical, and have given rise to secondary schools with an agricultural bias where the education is almost entirely of a theoretical nature, to lower agricultural schools (*Ackerbauschulen*), where the education is largely theoretical, and to winter schools (*Winterschulen*), where only theoretical education is given. This tendency is no doubt largely due to the fact that a practical man who becomes a teacher finds it difficult to resist the temptation gradually to stereotype the subjects which he is called upon to teach. It has been overcome in some measure as regards Prussian agricultural education by the successful development of the itinerant method of teaching, which not only benefits the agricultural teachers, who are withdrawn from their stationary activities and revive their practical experience during their wanderings, but also the students, who, besides getting the benefit from the new experiences of their teachers, are also encouraged to make similar journeys about the country, not, however, in order to teach, but to learn by observing the different procedure adopted in various districts.

KINDS OF SCHOOLS, ETC.

Lower agricultural education in Prussia may therefore be classified under the following heads :—

- (a) Secondary schools with an agricultural bias.
- (b) Lower agricultural schools.
- (c) Winter schools.
- (c) Itinerant centres.
- (e) Special schools.
- (f) Schools for women and girls.
- (g) Miscellaneous courses.

AGRICULTURAL SECONDARY SCHOOLS.

The secondary schools in Prussia with a well-defined agricultural "side" at present number 18. Their position as regards the agricultural colleges, on the one hand, and the lower agricultural schools, on the other, is indefinite : they cannot be regarded strictly as preparing their pupils for continuing their studies in agriculture at the University, nor can they be said to have any direct connection with the lower agricultural schools. They do not therefore form a rung in an agricultural educational ladder. Their purpose is to provide an agricultural education combined with the usual secondary education, which combination will lead to the pupils being able to qualify for the certificate allowing them to serve but one year in the army, instead

of two or three. This last is one of the most important parts of their constitution, as it is this right that makes these schools definitely secondary, and gives to the teachers in them the corresponding influence and professional status. The general rule is that these schools are combined with or form part of a non-classical secondary school, and that in the lower three forms the work is the same in both parts of the school, while the upper three forms are divided into what might be called in an English school a "modern" side and an "agricultural" side. The position might be compared to an English secondary school of the new "municipal" type, where more attention is given to mathematics, science, and modern languages than to classics, if the lower three forms remained as they are now, while the upper three forms were divided into a "modern side" and an "agricultural side." The following table gives an idea of the distribution of work on the "agricultural side" in one of these schools:—

Languages (German and one other modern language— as a rule, French)	9	9	9
Geography, history, scripture, and drawing	7	7	7
Mathematics	5	4	4
Science (including zoology, botany, physics, chemistry, and mineralogy)	8	10	8
Agriculture	4	4	6
Gymnastics and singing	3	3	3
Total hours per week	36	37	37

Some particulars as to these schools, chiefly for the year 1908-9, are given below:—

Number of schools	18
Total number of pupils	4,293
Of which were—	
(a) In lower three forms	1,733
(b) In upper three forms—	
(a) Modern side	353
(b) Agricultural side	2,207
Number of pupils on the agricultural side whose parents were engaged in agriculture	1,212
Number of pupils whose parents were not so engaged or were foreigners	995
Total number of teachers	220
Average yearly fee paid by each pupil—	£ s. d.
(a) Lower three forms	5 0 0
(b) Agricultural side	6 10 0
Estimate of average yearly cost per pupil, including all classes	15 2 0

It will be seen from this statement that no less than 54 per cent. of the boys in the agricultural department of these schools were the sons of parents who were themselves engaged in rural pursuits. It may be assumed that this large percentage is due to the fact that the better class of German land-owners and farmers recognise that the education to be obtained in these schools is valuable. In this connection, however, it must not be forgotten that these schools have the right of granting the certificate for one year's military service, although, on the agricultural side, only one language other than German is taught a circumstance that might appeal to the father of a dull boy.

Dr. Oldenburg* laments the fact that the ideas of the founders of these schools have in the course of time been lost sight of, since, instead of these schools being purely agricultural and essentially practical, they have developed into ordinary secondary schools with an "agricultural side," as it were, inserted into them, and, instead of being practical in their teaching, they are mainly theoretical. The reasons for this change he does not give, but they are to be found, on the one hand, in the modern tendency to specialise in education and at the same time (by reason of the increase in central government) to limit the number of main categories of educational institutions, and, on the other hand, in the overwhelming influence that matters military exercise on matters purely educational in Germany.

WINTER AND WHOLE-TIME LOWER AGRICULTURAL SCHOOLS.†

Turning now to the lower agricultural schools and to the winter schools, we find that they are best considered together: the first are open all the year except during holidays, while the winter schools, as their name implies, have only winter courses. These schools are undoubtedly the most important institutions in the Prussian agricultural educational system. Dr. Oldenburg points out that in normal circumstances more than 70 per cent. of Prussian farmers have to look to these schools for their own technical instruction or for that of those of their sons who intend following an agricultural career. In ordinary cases the sons of small farmers have very little opportunity of increasing their knowledge by private study, or by travel, so that the importance of the curriculum and of the methods taught in such schools is very great, since it is only the knowledge that the young farmer carries away with him when he has finished his course at an agricultural school that can explain and turn into right lines the practical experience that he gains in his daily work on the farm.

* *Das Landwirtschaftliche und zweckverwandte Unterrichtswesen im Königreich Preussen*, Dr. G. Oldenburg. Berlin, Paul Parey, 1910.

† In this section lower agricultural school is used as a translation of the term *Ackerbauschule*, where instruction lasts for one and a half to two years, as opposed to winter school (*Winterchule*), where there are two winter terms in consecutive years.

The history of the lower agricultural schools and the winter schools shows how the ideal is influenced by the practical, and how the practical usually gains the victory. The lower agricultural schools had their beginning in a farm school, where the young farmers worked for two years. Theoretical instruction was combined with practical work on the farm. It was, however, soon felt by the farmers to be a hardship that their sons should be taken away entirely from the parental farm, and so winter schools were introduced, which, in two courses of six months each, supplied theoretical instruction, while the practical work was done during the busy season by the students working on their fathers' farms. This system was found to meet almost every need, and for this reason it is interesting to compare the growth of these winter schools with the backward movement of the other institutions.

Year —	1875-6.	1882-3.	1890-1.	1898-9.	1902-3.	1908-9.	1911.	1908-9 Compared with 1875-6.
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NUMBER OF SCHOOLS.

Lower agricultural schools	26	33	27	26	19	17	16	- 9
Winter schools	12	38	61	103	119	184	212	+ 172

NUMBER OF PUPILS.

Lower agricultural schools	583	696	1,061	964	1,032	1,011	*	+ 428
Winter schools	164	885	2,235	4,102	4,753	7,273	9,357	+ 7,109

* The number of pupils at the end of the summer term was 406; the number of new pupils who remained during the whole winter session was 713.

This table shows clearly that the Prussian farmer is very desirous of helping his son to obtain technical instruction in farming, so long as it does not interfere too much with the aid that he expects to get from his son in working his farm. It must be remembered in this connection that these farms are for the most part only from five to fifty acres in extent. The success of the winter schools is, of course, largely due to the fact that the pupils who enter them are already well acquainted with the practical side of agriculture, and are therefore in a position to make good use of the theoretical instruction that they offer. They are also cheaper to maintain, since a smaller staff can deal with theoretical work than with practical demonstrations, and naturally, too, a small farmer can better afford to pay fees for two courses of six months than for two one-year courses. Dr. Oldenburg also sees a great advantage in the fact that the teachers in the winter schools can be

utilised during the summer months as peripatetic teachers, which is not only to the teachers' own advantage, since they are thereby enabled to gain constant practical experience and so improve their theoretical teaching, but it is also to the advantage of both the school and the farmers, who are kept in touch with the institutions where they themselves were educated, and where they expect to send their sons. There can be no doubt that the popularity of the Prussian winter schools among farmers is largely due to the peripatetic teachers. It may also be observed here, as regards the lower agricultural schools (not winter schools), that not only has their number decreased, but that their nature has altered: they were originally small farm schools, giving practical and theoretical instruction; those that still exist are larger schools, giving for the most part only theoretical instruction.

Before giving statistics as to these schools and commenting on the financial and administrative conditions by which they are governed, it will help to a better understanding of their nature if an example is taken and the curriculum described. It must not be forgotten, however, that the conditions vary in different provinces, and that there is no scheme that is applied to all of them; in fact, as is pointed out later, the tendency at present is towards decentralisation. Also, although a winter school is described, the conditions in a lower agricultural school are very similar.

The school of Marienberg, in West Prussia, will serve as a good example. This school is affiliated with the agricultural secondary school of the same name, and the headmaster of the secondary school is director of the winter school. The regulations of this school follow the regulations of the province, and impose certain conditions, such as the age of the students, their previous education (*e.g.*, they must at least have passed through an elementary school), and the production of certificates as to the personal character of both the prospective student and of his parents, before permission to attend the school is given. The course includes two winters, and lasts in each year from about the middle of October to the end of March. The time table (in hours weekly) is arranged on the following model:—

German (essay writing, &c.)	4	2
Practical mathematics	5	4
Geography and history	2	2
Chemistry, physics, &c.	5	5
Agriculture	3	3
Plant life and management	4	4
Animal life and management	6	6
Farm management and bookkeeping	4	4
Agricultural laws and regulations	2	2
	<hr/> 35	<hr/> 32

In addition, there are excursions and debates. From time to time instruction is given in leather-work and similar practical subjects. The fee is £1 10s. for each winter. In addition to the director of the school, there are three teachers for technical subjects and two other teachers. The technical teachers are engaged also in peripatetic work; in 1908-09 the number of students in the first-year class was 33, and in the second, 21; the parents of the whole 54 were engaged in farming. It is difficult in this particular case to give the exact financial position on account of the school's connection with the secondary school, but the average normal expenditure in such a school would be about £450, of which sum 25 per cent. might come from the fees and other receipts of the school, 30 per cent. from the State, and the remaining 45 per cent. from the provincial and local authorities.

The administrative and financial policy in connection with the whole system of these local agricultural schools was settled in its broad lines as far back as 1875, when it was decided that the control over these schools should be local, and that the bulk of the money necessary should be provided from local sources. At the same time, however, certain grants were made from the State, but on the understanding that they were not to be increased with increased cost of the schools. The result of this policy has not only been that the growth of lower agricultural education in Prussia has depended in the different districts on the enthusiasm or lack of enthusiasm shown by the local authorities, but, what is more important, the schools have developed according to local needs, and the type of instruction given in each district is in accordance with the needs of that district. The value of the freedom that has been given to the different provinces has undoubtedly been very great, although in some cases, from lack of appreciation of the importance of their responsibilities, an undesirable tardiness has been shown by the local authorities. The number of these schools has much increased in the last few years, and this increase has been largely brought about by the indirect aid given by the State, in that large grants have been made for the peripatetic work, carried on for the most part by the teachers in the winter schools.

It is not proposed to enter here into details of the relations between these schools and the local authorities. As a rule, the administrative power is in the hands of a definite local authority (*Kreisverband*) or of the Chamber of Agriculture; in most cases, however, although one of these two bodies may have the actual control, both share the responsibility of finding the money.

The table on page 9* shows the distribution of these schools in the various provinces; the area of each province has been added to allow of comparison; this area is, however, the total area of each province, and has no reference to land under cultivation; the area of agricultural land in square miles (taking 1 ha. = $2\frac{1}{2}$ acres) to a school, and the number of farms to a school is

* These figures refer to 1907; by 1911 the total number of both classes of schools had increased to 228, with a proportionate increase in the total expenditure.

also given; the total cost column includes expenditure on peripatetic work (taking 1 mark = 1s.).

The total cost for Prussia of these schools (*Ackerbau* and *Winterschulen*) for 1908-09 was provided as follows:—

	£
By fees, &c.	21,552
“ the provinces	15,993
“ the old grant (<i>Dotationsrente</i>)	7,272
“ the local authorities.	16,630
“ agricultural societies, &c.	3,297
“ State grants for peripatetic work	23,085
Total cost* provided for	<u>87,829</u>

It should be noted that the “old grant” above mentioned is the grant that was made over to the provinces at the time of the decentralisation in 1876 as an endowment.

The present position of these schools is satisfactory. The great requirement of schools of this type is that they should enjoy the confidence of the

Distribution of Schools in Provinces in 1907.

Province.	Number of Agric. Schools.	Number of Winter Schools.	Total Cost 1907.	For Every School there are of—		Area of the Province in Sq. Miles.¶
				Agric. Land.	Farms.	
			£	Sq. Miles	No.	
East Prussia	—	15	5,390	464	4,585	14,786
West Prussia	—	9	3,171	477	4,934	9,861
Brandenburg	3	8	6,252	643	6,246	15,383
Pomerania	1	6	7,515	610	7,204	11,631
Posen	—	10	3,589	471	6,380	11,190
Silesia	1	10	6,223	597	9,038	15,569
Saxony†	1	12	6,389	383	4,690	9,752
Schleswig-Holstein.	2	9	4,956	460	4,184	7,338
Hanover	5	32	14,097	238	2,262	14,870
Westphalia	2	19	9,883	216	2,391	7,804
Hesse-Nassau	—	13	4,249	339	6,529	6,062
Rhine	1	40	11,532	110	1,797	10,423
Hohenzollern	1	1	487	96	1,808	441
Total or Average .	T. 17‡	T. 184§	T. 83,733	A. 320	A. 3,758	T. 135,110

* By the financial year 1911 this had increased to £110,999.

† The Province, not the Kingdom of Saxony. ‡ By 1911 these had decreased to 16.

§ By 1911 these had increased to 212. ¶ These figures are those given in the *Stateman's Year-Book*, 1912.

farming community and be allowed to develop according to the needs of the districts in which they are situated. It has already been shown that the farmers send their sons in large numbers to the winter schools, and the peripatetic work is steadily increasing the reputation of the schools. The policy of decentralisation, too, has worked well, and allows every opportunity for the satisfaction of local needs. Dr. Oldenburg is, however, of the opinion that the number of schools should be greatly increased. He believes that the smaller the area a school serves, the better it is for the school and the neighboring farmers, since then the cost of access to the school is diminished and the peripatetic teachers become better known, if the teachers are not allowed to move from school to school, unless under special circumstances.* He assumes that 40 pupils to a school is a convenient number (thus making two classes of 20 each in a winter school), and that each farm provides one pupil each generation; the ideal, therefore, would be one school to 1,200 farms.† As we have seen from the table on page 9, the average in Prussia in 1907 was one school to 3,758‡ farms, which, although far from being the ideal ratio as put forward by Dr. Oldenburg, is nevertheless a proof that this form of Prussian agricultural education can compare favorably with that existing in other countries.

PERIPATETIC WORK.

Peripatetic agricultural work in Prussia is carried on in two different ways. In the first place, a large amount of this work is done by the staffs of the schools just described, especially by the staffs of the winter schools, who in their free time are employed by the State to perform this work. Reference has already been made to the advantages of this system. In the second place there are a number of peripatetic teachers in Prussia who spend their whole time in doing this work. These men are employed for the most part by the Chambers of Agriculture, and the necessary funds are supplied to a large extent by the State. Their duties are not limited to the delivery of lectures in the villages and small towns as opportunity offers; they are especially required to see that new ideas and inventions and the progress generally of agricultural science and technique are brought to the notice of the agriculturists in their districts, and to do this they are recommended to make the fullest use of informal conversation and of practical demonstrations to small groups of farmers or to individuals. The tendency is to employ men who have, in addition to an all-round knowledge of agriculture, a special knowledge of some particular branch of the subject, and the convenience of this arrangement is apparent when it is considered that in a country like Prussia, with varying climates, each special branch of agriculture is usually

* The policy of not allowing the peripatetic teachers to change their districts when they have once become known is controversial.

† It must be remembered that many of these "farms" are very small indeed.

‡ This ratio is at present still nearer to Dr. Oldenburg's ideal; the exact figure cannot however be given.

most at home in some one province. The following table indicates the number and provinces of the various Prussian whole-time agricultural peripatetic teachers : -

Special Subject or otherwise.	East Prussia.	West Prussia.	Brandenburg.	Pomerania.	Posen.	Silesia.	Prov. of Saxony.	Schleswig-Holstein.	Hanover.	Westphalia.	Hesse-Nassau.	Rhine.	R.-B. Sigmaringen.	State Total.
General	2	2	1	—	1	1	1	1	—	—	1	—	—	10
Corn-growing	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Animal-breeding	2	1	3	—	1	1	2	1	1	2	3	3	1	21
Pig-breeding	—	—	—	—	—	—	1	1	1	—	—	—	—	2
Dairying	1	—	—	—	—	—	1	3	1	2	—	1	—	9
Horse-breeding	—	1	1	—	—	—	1	1	—	1	—	—	—	5
Blacksmith's work	1	1	—	—	—	1	1	—	—	—	—	—	—	3
Poultry-breeding	—	1	1	—	1	1	1	1	—	1	—	1	—	8
Fruit cultivation	3	1	1	3	2	3	3	1	1	1	1	1	—	21
Fruit and vine cultivation	—	—	—	—	—	—	—	—	—	—	2	—	—	2
Vine cultivation	—	—	—	—	—	—	—	—	—	—	—	4	—	4
Flax cultivation	—	—	—	—	—	1	—	—	—	—	—	—	—	1
Co-operation	—	—	—	1	—	—	—	—	1	—	—	—	—	2
Bookkeeping	—	—	—	—	—	—	1	—	—	—	—	—	—	1
Total	9	7	7	5	5	7	12	8	5	7	7	10	1	90

The table on page 12 shows the financial position* of this work. In this connection it should be noted that the State contributions are large compared with those from local sources, and it must not be forgotten also that these figures do not include the State aid given to the staffs of the winter and other agricultural schools in aid of the peripatetic work carried on by them.

SPECIAL SCHOOLS.

In addition to the schools that have already been described, there are a large number where instruction is given in some special subject. These schools are supported partly by the State and partly by the local authorities. It is not proposed to discuss the details of management of these schools ; it may be said, however, that the period over which the instruction extends varies greatly. Sometimes it is more or less similar to the scheme adopted in the winter schools ; frequently it lasts only for a day each week for a year or a period of years ; sometimes it is a few weeks in the summer ; the period depends in every case on the particular subject and the convenience of those who find it advisable to study that subject. In some cases these

* In 1907, taking 20 marks = £1.

schools—as, for example, the schools for beekeepers—are used as research institutions and carry on intelligence work; the teachers may also be engaged in peripatetic work.

Financial Position in Relation to Peripatetic Work in 1907.

Special Subject of the Peripatetic Teacher or otherwise.	Number of Teachers.	Total Funds.	Funds Obtained From—			
			State.	Local Authorities.	Agric. Chambers.	Other Sources.
		£	£	£	£	£
General	10	2,354	1,804	100	450	—
Corn-growing	1	200	140	—	60	—
Animal-breeding	21	6,377	4,225	300	1,852	—
Pig-breeding	2	533	340	—	193	—
Dairying	9	1,728	975	—	753	—
Horse-breeding	5	1,056	744	—	312	—
Blacksmith's work	3	402	325	—	77	—
Poultry work	8	1,268	1,030	—	238	—
Fruit cultivation	21	4,333	2,775	498	1,060	—
Fruit and vine cultivation	2	210	120	60	30	—
Vine cultivation	4	775	433	342	—	—
Flax cultivation	1	111	99	—	12	—
Co-operation	2	760	530	—	175	55
Bookkeeping	1	195	195	—	—	—
Total	90	20,302	13,735	1,300	5,212	55

The following table gives some idea of the extent of this work:—

	Number of Schools.	Number of Pupils in 1908.
Schools for meadow and grass cultivation	5	460
“ gardeners and vinegrowers	15	405
“ dairy work	14	225
“ for beekeepers	3	47
“ blacksmiths	65	785
“ poultry-keepers	7	78
“ foresters	4	195
Total	113	2,195

SPECIAL COURSES.

A large number of special courses on various subjects are held for the benefit of agriculturists in all parts of Prussia. A small number of these

courses are of a quasi-scientific character, are conducted by Universities and similar institutions, and partake of the nature of University extension lectures for farmers. The majority of these courses, however, are short, practical series of lectures on such subjects as book-keeping, manures, pig-breeding, &c.

From the following table it will be seen that these courses reach a large number of people, and are apparently highly appreciated; it must, however, be noted that the majority of them last for a few days only:—

	Number of Courses, 1908.	Number of those Attending, 1908.
Courses of University extension type ..	11	2,300
Other courses	1,020	23,068
Total	<u>1,031</u>	<u>25,368</u>

In addition to the agricultural educational organisations already discussed or mentioned, there are courses of instruction for country women and girls in domestic economy and similar subjects; there is also a large amount of continuation school work carried on which affects the agricultural population in various ways; and finally a system of training colleges for agricultural teachers is established in order to supply the necessary pedagogic training to teachers who possess the theoretical and practical knowledge that is required for agricultural education, but who have had no teaching experience.

GENERAL REMARKS.

In the foregoing summary of the position of lower agricultural education in Prussia, two points have arisen on which stress may be laid in view of the present position in England and Wales with regard to this branch of technical education.

The first is the tendency shown by winter schools to increase and by the lower agricultural schools to decrease. This seems to be due to the fact that the agricultural population from whom the students are mainly drawn appreciate theoretical education given in winter, but do not appreciate practical instruction during the rest of the year, when equally good, and at the same time paid practical experience can be obtained on farms. The important inference would appear to be that schools with farms attached have been shown to be for the most part not necessary as long as the class from which the students are taken is an agricultural one; in cases where they are not so drawn the argument applies, or does not apply, according to whether a period of apprenticeship is, or is not, required before attending such a school. Special reference was also made to the decentralisation of lower agricultural education and the payment of a small fixed sum as State aid with indirect assistance given in the form of grants for peripatetic work.

This system appears to have worked well as soon as the local authorities and local agricultural societies had realised their responsibilities in the matter; in considering this financial system as a possible system on which to base the educational activities as regards agriculture in any other country, the political position of agriculture in Prussia must not be lost sight of.

The second point is that the Prussian educational system does not provide the educational ladder so frequently insisted on in this country; the fundamental idea is rather that equal opportunities are offered theoretically to everybody, but that whether these opportunities are utilised to the full depends on the financial position of a boy's parents when he is still very young. In agricultural education in Prussia this is particularly the case. The educational facilities that are offered are suitable to the various classes requiring them, and are so arranged as to correspond to the needs of these particular classes, but do not supply anything in the shape of an educational ladder. It is almost impossible for a young man who has not received an advanced secondary school education to gain entrance to a University or Technical College as an ordinary student, however promising his technical attainments may be. To prevent misconception, however, it should be understood that University and higher education generally is very cheap in Prussia, and, providing the *right start* has been made, there are no artificial difficulties in the path of the humblest aspirant to the highest academic and professional honors.



Ostrich Farm, Port Augusta.

POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

OPERATIONS FOR JULY.

BREEDING.

This is the month when the majority of the heavy-breed chickens should be hatched : this applies more particularly to the districts north of Adelaide. In some late localities, such as the hills and in the South-East, the breeding season for heavy breeds may extend to October, but in the warmer districts September is late enough if the best specimens are to result.

Broody Hens are becoming scarcer each year, and where definite progress is to be made, artificial incubation must be resorted to. However, there are many who are contented with the natural method, and whose requirements are only a few dozen chickens. Preparing the nest is a matter of importance. The ground is the best place, and where possible a small poultry-house should be devoted to each hen. In this make the nest, which should be a shallow depression, lined with a little grass or short straw. Screen the nest by the aid of a piece of sheet-iron—hens like privacy. Provide in one corner of the house a dust bath composed of fine dust, to which may be added some wood ashes and a little powdered sulphur. Keep a supply of fresh, clean water close to the hen. Do not feed the hen when on the nest. She should be encouraged to leave her nest daily for food, and to use the dust bath. Feed on grain, principally wheat.

Vermín. Examine the hen before placing her on the clean nest. If vermin-infected thoroughly dust the plumage with a good insect powder. Good health is imperative. If the hen suffers from any disease or is loose in the bowels she is not in a fit condition to do her duty as a sitter.

Night time is the best time to move a sitting hen from the nest of her choice to that determined upon by her owner. Hens are somewhat stupid, and if moved at night, carefully, will generally settle down in the nest and remain there. If moved in daylight they are apt to become restless and will not "sit."

The eggs should be carefully chosen. First and foremost it must be remembered that upon the eggs incubated depend the chickens and their value. Some people seem to think that one egg will do as well as another. Each egg should be chosen for a definite purpose, *i.e.*, whether to produce exhibition, laying, or table bird stock. A cheap "sitting" is the general aim.

and the consequent results are also "cheap." Buy or otherwise obtain your requirements from the owner of stock of the best description for your purpose. Reject any small or over large eggs, also those which are misshapen, or which have rough, chalky-looking shells. Size in eggs is a modern requisite. If you select for hatching the eggs laid by a hen which always lays small eggs you will perpetuate this undesirable feature. Examine the nest at frequent intervals, and, if found to be vermin-infected, or the hen herself infected, apply insect powder. Should an egg be broken and the contents have contaminated the other eggs, the nest should be remade, and any soiled eggs should be washed in warm water and dried with a clean cloth. When the eggs are hatching the hen should be left alone and on no account disturbed. At this period the hen is nervous and anxious, and should anyone approach the nest she becomes restless and may trample upon and kill some of the chicks. Some old hens, however, are very quiet.

Examine the chicks from time to time, giving particular attention to the head and vent. Much mortality, due to external parasites, occurs among chickens running with hens.

INCUBATORS AND HENS.

Some breeders hatch the eggs in incubators and then give them to broody hens to rear. This is only possible when one has large numbers of heavy-breed hens which have been laying during early autumn and are broody when required.

CAPONISING.

Several people have asked for an expression of opinion on this subject. In the first issue of *The Journal of Agriculture*, August, 1897, there was an article upon this subject. At that time I held, as I still hold, the opinion that from a commercial standpoint there is nothing to be gained by the operation. For private persons, who do not mind the cost of keeping the birds until they are from 10 months to a year old, there may be some advantages.

Reference is frequently made to the market for capons in America and Europe. In England the demand is small. On the Continent, in France, and elsewhere there is a limited demand, and at some seasons in Paris the price of a well-grown, fat specimen is 25 francs. In America large crossbred and other chickens well fattened are dressed in a certain manner, and are known in the trade as "capon," but they are not so.

The advantages are that one may hatch during the season enough chickens, say one-half of which are cockerels, to provide table birds for the year. Certain breeds and crosses attain great size, and if well fattened are very heavy. The quality of the flesh is excellent, but not equal to prime "crammed" chicken. Naturally the flesh of a capon is vastly superior to that of an adult cock,

The disadvantages are that there would only be a limited market. The demand is for chickens of 3½lbs. to 5lbs. weight at the outside. For private use large chickens are not in demand. The benefit of the operation does not accrue until the caponised bird is about a year old, and, therefore, the cost of feeding would be from 5s. to 6s. a bird. In addition to cost of feeding, one has to add the losses from the ordinary risks of poultry-keeping, and also the loss, however small, as a direct result of the operation.

If the operation is skilfully performed the resulting capon will be very docile. If, on the other hand, as frequently occurs, a "slip" is produced, the bird becomes a perfect nuisance in the poultry yard and will not fatten. There is a disposition to seek, in such operations as caponising, a royal road to success. The royal road to success is consistent and methodical work on approved lines. In table birds the demand is for plump, well-fattened chickens of from 3½lbs. to 5lbs. live weight. The quicker a breeder can produce and market his table birds at these weights the greater his profit. All the poulterers in Adelaide are asking for really good chickens and are prepared to pay good prices. They cannot get these birds in sufficient numbers to meet their requirements. Any farmer or poultry breeder can produce the required article with a little method, but the supply is not equal to the demand. Why, therefore, talk of caponising, and teaching people an operation which is not so easily performed and which is of very doubtful value? In my opinion the subject is not worth further space.

GREEN FOOD.

The practical absence of rain this season has made the production of early green food a very difficult matter. Land prepared for lucerne should be well worked, so that the seed may be sown in August. Kails, lettuce, rape, silver beet, &c., may be sown, or young plants "dibbled in" on rich ground.

DUCKS.

The duck is a voracious eater, and to feed on bran and pollard alone is expensive and unsatisfactory. From one-third to one-half the bulk of the food per duck should be green food, or, better still, lucerne hay chaff previously steeped in boiling water. Most breeders are wedded to bran and pollard, but they would gain better results if they ground wheat to a fine meal and then "bulked up" with scalded lucerne hay chaff.

LUCERNE HAY CHAFF.

Breeders complain that they cannot get this valuable article. There are merchants who would stock it if there were a constant demand. Breeders should ask for it. There is land enough in this State on the Murray reclaimed swamps and elsewhere to grow more lucerne than could be used, and yet there is no recognised market. In Queensland and New South Wales the

case is quite different. West Australian breeders import lucerne hay chaff from Victoria and New South Wales. The more lucerne and lucerne hay chaff there is used by poultry breeders the more poultry products will be available and the cheaper will be the cost of production.

HEAT OF BROODERS.

The proper heat of a brooder in this State should be about 90 degrees the first week, 85 degrees the second, 80 degrees the third, and 75 degrees the fourth week. This is for really cold weather; but as the days and nights become mild the temperature may be reduced. The use of a thermometer is just as important with a brooder as with an incubator—you must not trust to guess work. Cheap thermometers, if first tested, will answer for brooders. In all the best incubators where there is a tray underneath the egg tray for the reception of the newly-hatched chickens the temperature at the bottom will be found to be from 90 degrees to 93 degrees, and the chickens are comfortable.

COLD BROODERS.

After the chickens have left the heated brooder they require a warm sleeping-place, and these may conveniently be made circular in shape. A hoop made of ordinary hoop-iron and fitted with four legs about 9in. high will serve for a frame. Over this may be stretched bagging, and the sides may be made of a strip of felt, slit up every few inches to provide for ingress and egress. A perforated fruit tin may be fixed in the centre and covered with felt. This will prevent crowding in the centre and provides ventilation. There can be no crowding at the sides. These brooders may be placed in small chicken houses.

SOME HEN TROUBLES.

Ovarian Cysts.—I have occasionally had hens brought to me which, on examination, were found to have ovarian cysts. These cysts are full of yellowish fluid. I do not think the trouble is on the increase, but as breeders are becoming more observant more cases come under notice. An operation for removal can be performed, but it is doubtful if such a hen is worth keeping, and she certainly should not be bred from.

Protrusion of Oviduct.—This is generally due to inherent weakness of the organ, but may occur in a fat hen after undue strain. The bird should be fed sparingly. The parts should be bathed in alum water or a solution of boric acid—a teaspoonful to a pint of warm water—or a 1 per cent. solution of potass. permanganate. Carefully return the protruding organ and then sling the hen in a towel with the vent raised and the foreparts depressed. This tends to keep the organ in position until the muscles regain their tone. Keep her thus slung for a few days.

PARAFIELD POULTRY STATION.

EGG-LAYING COMPETITION, 1913-14.

[Started April 1st, 1913, to terminate March 31st, 1914.]

Competitor.	Eggs Laid for Month ended June 30th.	Total Eggs Laid from April 1st, 1913, to June 30th, 1913.
SECTION I.—LIGHT BREEDS.		
WHITE LEGHORNS.		
Hurford, E. W., Grangeville	118	252
Hammill, H., Kogarah, New South Wales	117	240
Carter, A. A., Keswick	42	111
Robins, G. W., Hawthorn, Victoria	121	256
Dunn, L. F., Keswick	111	206
McKenzie, H., Northcote, Victoria	133	282
Cowan Bros., Burwood, New South Wales	90	209
Robbins, G. W., Hawthorn, Victoria	102	199
Pettigrove, T. A., Northcote, Victoria	116	238
Eckermann, W. P., Eudunda	70	113
Robertson, F., New Hindmarsh	79	136
Pettigrove, T. A., Northcote, Victoria	143	248
Cant, E. V., Medindie	84	181
Schäfer, N. H., Strathalbyn	99	237
Redfern Poultry Farm, Caulfield, Victoria	103	221
Chapman, G. H., Port Pirie	54	131
Lewis, F. M., Caulfield, Victoria	66	181
Redfern Poultry Farm, Caulfield, Victoria	129	261
Hagel, W. C., Mallala	112	175
Hocking, E. D., Kadina	84	138
Sargenfri Poultry Yards, East Payneham	78	186
Joass, W. A., Rothbury, New South Wales	103	195
Bennett & Furze, Wright Street, Adelaide	76	188
Jury, W. H., Torrens ville	74	210
Olive Poultry Farm, Freeling	85	206
Kelly, Mrs. W. J. L., Quorn	10	65
Indra Poultry Farm, Freeling	124	272
Electricum Poultry Yards, Glenelg	74	202
Sargenfri Poultry Yards, East Payneham	120	248
Moritz Bros., Kalangadoo	120	259
Brown, S., Gembrook South, Victoria	125	260
Matthews, H. G., Fullerton	124	186
Harris, J. G., Black Forest	103	236
Tockington Park Poultry Farm, Grange	118	193
Bradley, J. E., Newport, Victoria	129	288
Miller, B., Parkside	80	100
McKenzie, E., Northcote, Victoria	135	316
Tockington Park Poultry Farm, Grange	101	239
Provis, W., & Son, Tumby Bay	126	211
Hillcrest Poultry Farm, Brighton, Victoria	101	248

EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended June 30th.	Total Eggs Laid from April 1st, 1913, to June 30th, 1913.
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SECTION I.—LIGHT BREEDS—Continued.

WHITE LEGHORNS—Continued.

Beadnall Bros., Gawler	32	142
Morgan & Watson, Frankston, Victoria	130	295
Kerr, R., Longwood	112	174
Gibbs & Pine, Queenstown	45	105
Hillside Poultry Yards, Hamley Bridge	40	142
Hall, A. W., South Oakleigh, Victoria	34	194
Dreyer, G. H., Wolfram Street, Broken Hill	113	211
South Yan Yean Poultry Farm, Doreen, Victoria	73	156
Pope, R. W., Heidelberg, Victoria	110	264
Tabuteau, J. O., Black Rock, Melbourne	127	271
"Koonoowarra," Enfield	74	184
Hagger, J. C., Orroroo	124	192
Bertelsmeier, C. B., Clare	106	205
South Yan Yean Poultry Farm, Doreen, Victoria	97	182
Jelliff, Mrs. T., Beverley, Adelaide	119	219
Hughes, J. J., Elsternwick, Victoria	32	142
Stewart, J. R., Thirlmere, New South Wales	99	163
Aveling, T. B., Quorn	72	106
"Nunkeroi," Neales Flat	63	104
Prior, D., Moonta Mines	77	145
Leonard, W. J., Port Pirie	60	150
Barkla, L. W., Gawler South	62	152
Foreman, E., Hindmarsh	60	138
Broderick Bros., Gawler	43	99
Tubb, E. C., Frewville	61	102
Harfield, B. L., Pinnaroo	28	114
Foreman, E., Hindmarsh	59	102
Tomlinson, W., Westbourne Park	61	196
Woodhead, H., Torrensville	112	231
Padman, A. H., Hyde Park	83	198
Franklin, G., Norwood	101	201
Mathias & Weller, Unley	53	77
Messenger, A., Port Adelaide	90	177
Purvis, W., Glanville	69	178
Albion Poultry Farm, Magill	81	230
Dunstan, L. A., Port Pirie	50	134
Trenwith, T. H., Kadina	29	107
Purvis, W., Glanville	63	186
Rice, J. E., Cottonville	95	212
Evans, H. A., Richmond	57	129
Miels, C. & H., Littlehampton	91	216
Swift, W. G., Northcote, Victoria	94	213
Bertelsmeier, C. B., Clare	100	211
Brundrett, S., Moonee Ponds	57	119
Glenelg River Poultry Farm, Mount Gambier	73	159
Padman, A. H., Hyde Park	77	161
Purvis, Miss Gracie, Glanville	51	135
Braund, J. E. & H. J., Islington	59	148
Ontario Poultry Farm, Clarendon	9	113
Brock, A. G., Hamley Bridge	18	49
Russell, E. L., Salisbury	50	126
Schwabl, J., Elsternwick, Victoria	70	158
Moritz Bros., Kalangadoo	52	192

EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month Ended June 30th.	Total Eggs Laid from April 1st, 1913, to June 30th, 1913.
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SECTION I.—LIGHT BREEDS—Continued.

WHITE LEGHORNS—Continued.

Craig Bros., Hackney	63	122
Codling, H., Mitcham Park	42	150
Tidswell, H. J., Clarence Park	28	88
Bennett, E. V., Kalangadoo	69	182
Lillywhite, R. G., Malvern	63	126
Harris, A. W., Mallala	93	164
Hagger, W. H., Malvern	107	239
Winter, W. C., (Nalpa), Strathalbyn	32	90
Whitegate Poultry Farm, Deepdene, Victoria	44	104

BROWN LEGHORN.

Toe, C. E., Brighton, Victoria	15	22
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BLACK MINORCA.

Whitrow, A. J., Knoxville	53	66
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SECTION II.—HEAVY BREEDS.

BLACK ORPINGTONS.

Neville, A. B., Fullarton	79	124
Thornton, W. J., Kew, Victoria	79	118
Kenway, D., West Pennant Hills, New South Wales	82	238
Martin, B. P., Unley Park	103	145
Cowan Bros., Burwood, New South Wales	62	151
Tockington Park Poultry Farm, Grange	26	72
Pearson, W. S., Kingswood	21	83
Hall, A. W., South Oakleigh, Victoria	30	101
Padman, J. E., Plympton	53	144
Greaves, W. E., Prospect	20	57
Bertelsmeier, C. B., Clare	20	56
Coto, T. W., Myrtle Bank, Victoria	13	153
Convent of the Good Shepherd, Oakleigh, Victoria	19	68
Craig Bros., Hackney	78	141

BUFF ORPINGTONS.

Hocart, F. W., Clarence Park	44	109
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SILVER WYANDOTTES.

Dunn, L. F., Keswick	83	196
Western, F. C., Marion	64	98
Tockington Park Poultry Farm, Grange	82	166
Kappler Bros., Marion	45	97

WHITE WYANDOTTES.

Bradley, J. E., Newport, Victoria	60	140
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BLACK LANGSHANS.

Stevens, E. F., Littlehampton	31	108
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FAVEROLLES.

Williams, W. H., Frewville	—	—
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DORKINGS.

Cathcart, J. F., Newburg, Scotland	4	51
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EGG-LAYING COMPETITION—Continued.

Competitor.	Eggs Laid for Month ended June 30th.	Total Eggs Laid from April 1st, 1913, to June 30th, 1913.
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SECTION III—PRODUCERS.

Limited to Entries from Farmers, Pastoralists, Fruit and Vegetable Growers.

WHITE LEGHORNS.

Broster, G., Mallala	72	188
Carling, R., Kangaroo Flat	77	214
Rowe, J., Long Plain	88	196
Broster, G., Mallala	66	200
Gilbert, F. W., Kangaroo Flat	102	188
Campbell J. D., Barabba	86	174
Forest Leigh Poultry Farm, Jamestown	63	94
Kerr, R., Longwood	86	172
Carling, Mrs. R., Kangaroo Flat	87	219
Rowe, J., Long Plains	72	148
Gill, R., Marrabel	39	95
Wurst, G. H., Marrabel	63	89
Sherrah, E., Long Plain	58	135
Rowe, N., Long Plain	82	149
Shepherd, R. H., Balaklava	54	124
Lacey, F. C., Kybybolite	92	222
Bertelsmeier, O. O., Booborowie	94	182
Dunn, H. J., Black Springs	55	121
Drake, C., Naracoorte	60	120
Rackham, C. Naracoorte	105	209
Holmes, F. A., Naracoorte	60	167
Hutchison, W. J. S., Naracoorte	49	68
"Herdsfield," Mount Gambier	99	228
Smith, R. L., Hynam	47	78
Gill, Mrs. J., Kapunda	70	100
Sampson, C., Kooringa, Burra	108	213

BLACK ORPINGTONS.

Dunn, H. J., Black Springs	21	21
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BLACK LANGSHANS.

"X.L.C.R.," Littlehampton	98	183
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D. F. LAURIE, Poultry Expert.



PARAFIELD EGG-LAYING COMPETITION.

MONTHLY REPORT.

HEALTH.

The general health of the birds has been good. There has been no case of sickness, nor any reappearance of chicken-pox, of which there were a few cases during the past month. The general appearance of the birds is most gratifying, as they are, with a few exceptions (moulters) in excellent condition, and are bright and active. They are very tame now, even the Leghorns, and confine their activities to busily scratching among the litter for grain, or enjoying a dustbath.

DEATHS.

Two deaths from cannibalism occurred. These deaths occurred in the same pen, and it was feared that other cases might occur, but prompt measures were adopted with evident success. Cannibalism is a vice generally restricted to the light breeds, and is due to a variety of predisposing causes. At various times breeders have, on seeking advice from me, reported numerous losses. As a rule the outbreak begins with a pullet having trouble in laying—she is attacked by the others with disastrous results. In some cases a vicious hen may peck another so severely as to cause a flow of blood, the sight of which excites the others to join in the horrible feast. Careful watch should be kept, and the offender segregated or destroyed.

MOULTING.

As previously stated, in most of the pens there were, more or less, pullets which moulted. In one pen—White Wyandottes—there were a few eggs laid even by the moulters. The fine protection of the spacious houses sheltered the half-clothed birds and warded off any ill effects of the rigorous weather. The close housing undoubtedly accelerated the process, and now nearly all the birds are through, and will lay shortly.

WEATHER.

The weather has been dry and very cold. There was practically no rain, but several heavy frosts, some of which were among the coldest on record. It seems, from the results of recent competitions that the birds—or a large proportion—start moulting soon after the beginning of the test. Had the birds been housed in ordinary open houses, and allowed liberty in open yards, there is no doubt that the results of the extreme cold experienced during the month would have been a greatly diminished egg yield, and a total cessation of laying among the greater number of the birds. The experience gained at Kybybolite has been invaluable in this respect.

BROODINESS.

Three Black Orpingtons upheld one of the characteristics of the breed.

EGG PRODUCTION.

The daily scores have shown a most gratifying increase during the month. June is always considered the critical month, and on three occasions

a great falling off in that month was recorded. This year, however, June shows an increase of over 2,300 eggs. The feature of the month is the consistently good laying of the six leading pens of White Leghorns. These are all inter-State entries, which not only please the eye in general appearance and type, but are also laying well. From now onward the scores will progress until the maximum is reached.

Last year (1912-13 Competition) there were 103 pens of White Leghorns (including 20 pens in scratching sheds). This year (1913-14 Competition) there are 102 pens of White Leghorns. The figures for the three months are instructive.

	1912-13.	1913-14.
April.....	4,276	3,921
May.....	6,833	6,073
June.....	7,587	8,383
Total.....	18,696	18,377
Average per pen.....	181.5	179.3

Considering the long succession of cold mornings, each registering many degrees of frost, the fine score for June is noteworthy. Early in July the figures and averages for last year will be exceeded, and there is every hope that, for some time to come and probably finally there will be a general improvement on last competitions.

The total scores are—Section I., 18,383; Section II., 2,615; Section III., 4,297; Grand total, 25,295.

FEEDING.

The methods which in previous tests have given such excellent results are continued. Judging by the number of written applications for details of feeding methods, and by the number of bulletins distributed, it would appear that the poultry station methods of feeding are largely followed in Australia. The morning meal, bran one part, pollard two parts—the bran scalded with hot meat-meal soup and then dried off with pollard and scalded lucerne hay chaff—is fed hot at 7.30 a.m. At midday a sufficient quantity of freshly cut green lucerne, chaffed, is fed to them. This lucerne is obtained from a lucerne grower near at hand. At night wheat is scattered in the straw which litters the pens. Fresh, clean water is supplied at all times. Grit (shell, quartzite, and charcoal) is consumed in astonishing quantities. A small trough containing grit is suspended in each pen.

VISITORS AND VISITING DAYS.

A number of competitors, inter-State, country, and other visitors have inspected the various pens during the month. As there seems some misunderstanding, it may again be stated that the Poultry Station and Competition are open to the public between the hours of 9 a.m. and 5 p.m. on the first Wednesday and the fourth Saturday in each month; not the last Saturday, as occasionally that is the fifth Saturday.

D. F. LAURIE, Government Poultry Expert and Lecturer.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on June 11th. Present—Messrs. A. M. Dawkins (Chairman), G. Jeffrey, C. E. Birks, T. H. Williams, J. Miller, G. F. Cleland, F. Coleman, G. R. Laffer, Col. Rowell, Professor Perkins, and G. G. Nicholls (Secretary).

FARMERS AND WOOLCLASSING.

A letter was received from the Gladstone Branch, asking that a woolclasser might be sent into the country during the shearing season to instruct the farmers in the preparation of their clips for market. At the instance of Mr. Jeffrey it was decided to transmit it to the Minister of Agriculture for his consideration.

AUSTRALIAN FOREST LEAGUE.

The Secretary was directed to inform Lady Symon (provisional secretary) that the board was in full accord with the aims and objects of the Australian Forest League, and hoped that her efforts would be rewarded with the fullest success.

EXPERIMENTAL FARMS.

In view of the closing of the Shannon Experiment Farm, the Shannon Branch of the Bureau asked the Board to persuade the Government to test some of the land in the vicinity of Minnipa Hill with superphosphate, wheat, and oats. It also suggested that rain gauges should be placed at intervals along the line between Yeelanna and the present terminus, and mentioned that the guard could take the readings when the train made its weekly trip. On the motion of Mr. Laffer, the communication was referred to the Minister.

NOXIOUS WEEDS.

The Orroroo Branch directed attention to "the bad state of the Government roads in this district with respect to star thistle, Bathurst bur, and stemless horse thistle, especially the first named," and desired to know if anything could be done in the matter before the weeds obtained too strong a hold to be dealt with successfully. It was resolved to refer the Branch to the report of the proceedings of the Farmers' Congress in Adelaide in September, when the resolution, consequent upon the recommendation of the Board, was rejected by a majority of those present.

HORSEBREEDING SOCIETIES.

Discussing the suggested horsebreeding societies, the Warcowie Branch wrote to the effect that it considered the nomination fee of four guineas too

high, and recommended that it should be only three guineas. It also suggested that the number of mares to be served in a single season should be limited to 70. The Board decided to pass the letter on to the Director of Agriculture.

DOG NUISANCE.

The Secretary was instructed to inform the Amyton Branch that its proposal respecting the discussion of the dog nuisance at the next Congress had been referred to the committee appointed to arrange the programme.

NEW BRANCHES.

Approval was given to the formation of new Branches of the Bureau with the following gentlemen as members, viz.: Coomandook Messrs. A. S. Chapman, J. Chapman, L. A. Williams, R. A. Williams, A. Williams, R. B. Williams, M. P. Wilkin, C. M. Wilkin, E. A. Luxmore, W. W. Brown, L. Brown, W. Ninnis, A. Bald, P. C. Potter, C. E. W. Hillman, H. C. Hughes, W. T. Legalley, O. J. A. Blatcher, F. O. Cordis, H. J. Badnock, H. Bald, H. J. Gosden, J. Brown, N. A. Brown, T. Datson, K. M. Beaton, J. Bald, F. A. Byerlee, R. Byerlee, A. Berg, J. Donnell, C. Mitchell, L. Crouch, T. H. Stott, A. J. Ninnis, A. J. Ritchie, A. Kilmartin, J. Kellett, E. C. Lynn, E. A. Lubeke, T. S. M. Driscoll, A. Ninnis; Roberts and Verran Messrs. B. Johnson, F. Masters, W. Sharman, H. Smith, A. J. Drayton, A. T. Cowley, W. H. Whitaker, C. Kuhndt; Tarcowie Messrs. A. C. Kotz, J. Breuer, J. P. Smith, W. Travers, J. O'Grady, W. Bowman, J. Symons, M. Magar, D. Butterick, S. Harding, L. Burgess, A. Kotz, J. R. G. Thomas, D. Murphy, P. Reynolds, T. Ninnis, F. Sanders, J. Burgess, M. McCarthy, C. McCann, J. McMahon, A. Dempster, C. Hortin, W. J. Ninnis, W. S. Bennett, M. Murphy, J. Dempster, W. Ninnis, F. Liebig, A. Schrowder, G. G. Lives.

NEW MEMBERS.

The following gentlemen were admitted as members of the Branches shown: Lameroo—L. Lackman, F. Hutchinson, O. Baker, H. Mayo; Keith—W. B. Sewell, J. E. Jenkins; Lucindale—P. W. Dow; Mount Gambier—E. F. Crouch; Hartley—P. Wegenknecht; Watervale—R. L. Mayman, J. Pope; Inman Valley—H. G. Allert, H. Gray, H. J. Martin, R. A. Mayfield, H. J. Dennis; Penola—J. Redman, J. Alexander; Narridy—H. Cox; Port Elliot—P. R. Cudmore, G. J. Snell, E. Lay, W. Squires; Coomooroo—G. B. Lillicrapp; Koppio—J. Graham, T. G. Miller; Mount Remarkable—T. S. Bishop, E. N. Willington, H. E. Challenger; Borrika—H. Richards; Claypan Bore—P. Cullinan; Yabmana—W. Schirmir; Elbow Hill—G. W. Bradley; Miltalie—C. F. J. Degner, A. B. Degner; Blackwood—J. Hilfers; Coonalpyn—J. F. Pitman; Pinnaroo—H. C. Whittle; Loxton—F. D. Heitmann, C. A. Shepherd, M. Seiler, A. A. Petch, A. G. Tucker, B. F. Beer, A. P. Goode; Foister—C. Payne; Wirrabara—E. Kavanagh,

R. Curtiss, F. Cockington, H. Gilbert, H. H. G. Hastings ; Booleroo Centre - G. R. Hein, J. Kerr, B. Kerr, G. Ashby ; Orreroo - J. H. Brown ; Utera Plains - J. N. Jacobs ; Canowie Belt - F. M. Schultz, J. Flower, M. E. Redden ; Wilkawatt - J. Wade, M. Hayes ; North Booborowie - H. Hains, H. Atkin. G. J. Hanlin, S. E. Mudge, H. Storr ; Port Germein - J. Pearce.

LIFE MEMBERS.

The distinction of life membership was conferred upon Messrs. J. Smith, A. C. Hirsch, and C. W. Pumpa of the Hawker Branch and Messrs. C. A. Sobels, E. E. Sobels, and G. Hunter of Watervale Branch.

PRACTICAL WORK BY AGRICULTURAL BUREAU.

PRUNING MATCH AT CLARE.

After a quarter of a century of good work in the interests of South Australian primary production, the Agricultural Bureau is extending its usefulness by undertaking more essentially practical work. Some experimental work has been done by isolated Branches, but a new departure has more recently been made by the inauguration of competitions among members of the Bureau and other agriculturists. For two years the Balaklava Branch has conducted competitions among wheatgrowers, and the Pinnaroo Branch has arranged for a similar competition this season.

Twelve months ago the Clare Bureau organised a pruning match, in which 120 competitors took part. Prizes and certificates were awarded to the successful men, and it was resolved to repeat the innovation this year. The second competition took place recently about three miles north of Clare. Mr. W. Patullo, an enthusiastic member of the Bureau, having generously made his orchard available for the contest. About a hundred competitors and onlookers from a considerable radius gathered shortly after 10 o'clock, and the stewards soon had the competition in full swing.

APPLES AND PEARS.

Competition in these classes was good. The competitors drew lots for the three apple and three pear trees respectively which they were to prune, and upon the starting signal the click-click of the seccateurs showed that all intended to get through their task in the time allowed. Each man had his group of onlookers, and many a man picked up a few points on pruning during the day.

The prizes in these sections were awarded as follows: Apples First, Mr. F. J. Knappstein; second, Mr. J. Butler; third, Mr. G. Foreman. Certificates for 80 points or over out of a possible 100—Mr. F. W. H. Lee and E. Q. Wishart. Pears First, Mr. O. Ward; second, Mr. O. Dunstan; third, Mr. T. Taylor. Certificates Mr. H. Bartlett, Mr. F. Knappstein, Mr. W. Bond, Mr. W. Burgess, and Mr. H. Field. The judge, Mr. D. Lyall, of Auburn, paid a high tribute to the quality of the pruning in these classes, especially of the pears. There was, however, a tendency to cut the pear and Jonathan apple laterals too short.

PEACHES.

In this class 30 minutes were allowed to prune one tree. Mr. E. O. Wishart secured the first prize with 92 points, and the second went to Mr. F. W. H. Lee with 91 points. Certificates Messrs. G. and W. Foreman, J. Butler, W. Bond, H. Bartlett, A. and F. L. Burgess, and O. Dunstan. The judge, Mr. J. T. Hayne, of Armagh, in commenting upon the work, said that most of the competitors had left too many fruit spurs and had not cut back enough laterals for next year's fruit-bearing wood. Seven of the competitors had made an excellent job of their trees.

WINE GRAPES.

The competitors in this class had to prune five trellis and five bush vines and tie the rods in 60 minutes. The first prize went to Mr. Arthur Bartlett, with 91 points. Mr. H. Field secured second place with 87 points, and Mr. J. Ward was third with 85 points. Certificates Messrs. H. Bartlett, W. Baker, O. Dunstan, W. Bond, and F. W. H. Lee. All the vines had been badly cut with frost, and the judges, Messrs. M. N. and E. O. Wishart, considered the work very creditable, having due regard to this handicap.

SULTANAS AND CURRANTS.

These classes commanded the greatest attention and secured the largest number of entries. In each, three vines had to be pruned and the rods tied in 25 minutes. Mr. R. Glaetzer secured the first place with 92 points for sultanas. Messrs. O. Ward and T. Taylor tied for second place with 89 points each. Certificates—Messrs. J. Butler, H. Bartlett, F. Lee, W. Bond, H. Field, H. Stewart, O. Dunstan, F. L. Burgess, and J. Ashby. Mr. C. T. Jarman, who had also acted as judge last year, said there was a decided

improvement on last year's work. A few competitors had not left sufficient spurs to provide for next year's wood.

Mr. A. P. Birks, who judged the currants, was also pleased with the quality of the work. First prize went to Mr. W. Bond with 96 points; second, Mr. E. O. Wishart with 90 points; and Mr. H. Barber third with 87 points. Certificates - Messrs. O. and J. Ward, T. Taylor, W. Foreman H. Field, J. Butler, J. Ashby, H. Bartlett, O. Dunstan, R. Glaetzer.

JUVENILE CLASS CURRANTS.

Entries here were few, but the judge, Mr. W. G. Lewcock, said the quality of the work, particularly in respect to clean cutting, was excellent, and might with advantage be noted by some of the competitors in the senior classes. The first prize went to R. Birks with 88 points, the second to R. Glaetzer with 85 points, third, R. Stacey with 82 points.

A MARKED IMPROVEMENT.

At the conclusion of the match a meeting was held in the commodious fruit-packing shed. Mr. D. Menzie, chairman of the Branch, presided, and the judges criticised the work after the announcement of the results of the competition. There was a consensus of opinion that the quality of the pruning all through was considerably better than that of last year.

The Secretary to the Advisory Board of Agriculture, Mr. Geo. G. Nicholls, congratulated the Branch upon its enterprise evidenced in this and other undertakings, and the successful work of the day, and expressed his intention of urging other Branches in the fruit-growing districts to arrange for similar competitions. He urged the Branch to engage in some experimental work, and paid a high tribute to the energy of the secretary, Mr. P. H. Knappstein, for his untiring energy and successful work for this Branch of the Bureau. Special mention was made of the work of Mr. Knappstein and Mr. M. Nolan, who, as joint secretaries of the pruning competition, had so organised the proceedings that everything was carried out without the slightest hitch or delay.

The committee of management consisted of -Messrs. D. Menzie (chairman), M. Patullo, J. H. Knappstein, E. Victorsen, M. Hicks, C. Radford, E. Kelly, and the joint secretaries.

FARM SCHOOLS IN FRANCE, GERMANY, AND BELGIUM.

The following article is reprinted from the March number of *The Journal of the British Board of Agriculture* :

In view of the attention which is now being given to the subject of farm schools and institutes, an educational pamphlet recently issued by the Board of Education is of interest. The author, Mr. R. B. Greig, has had exceptional opportunities of becoming acquainted with the systems of agricultural education adopted on the Continent and in the Colonies ; his observations and conclusions are, consequently, entitled to careful consideration.

A large number of schools and colleges were visited by Mr. Greig ; they can be classified as follows :

- (a) Farm schools situated on farms.
- (b) Winter and short course schools with no farm.
- (c) Long course schools with no farm.
- (d) Secondary schools with an agricultural side and a farm.
- (e) Schools of practical agriculture with farms.
- (f) Agricultural colleges.
- (g) Itinerant instruction and women's institutes.

The first class - farm schools situated on farms - are found in France, Germany, and Belgium.

The author is of opinion that institutions of the type of the French *Fermes-Ecoles* have no conceivable place in English education, in view of the fact that elementary practical instruction is readily obtained on an ordinary farm ; in some parts of Ireland, he thinks, schools of this type might be successful.

The German type of farm school suffers from the grave defect that, in practice, it has not succeeded in attracting the peasant farmer class ; it is resorted to by youths who wish to qualify as managers or officials.

In Belgium, however, Mr. Greig found a school of the first type (*Ecole Ménagère*) for girls doing useful work. It was one of a number organised for the purpose of instructing women in household management and domestic economy, which have been in successful operation for 20 years. The specific subjects taught are laundry work, dairying, and poultry-keeping, and almost every duty which falls to the lot of a farmer's wife is the subject of instruction and explanation, from the point of view of interest as well as economy.

- (b) Short course schools with no farm.

An admirable type of this class of school was found in Sweden, near Svalöf. The programme of this school includes a winter session for men

and a summer session for women. The school adjoins the well-known Swedish Seed Station, and is in the midst of a district where the farming is of a very high class.

(c) Long course schools with no farm.

As a type of this class of school the author describes a visit to a German Landwirtschaftsschule at Hildesheim. From this school over 90 per cent. of the students return to practical farming. The technicalities of farming are not taught, only underlying scientific principles are dealt with, and about one-half of the time is given to ordinary school subjects.

(d) Secondary schools with an agricultural side and a farm.

Under this head Mr. Greig describes the Agricultural High School at Ballarat, Australia. The syllabus here also includes ordinary school subjects, and only one-third of the pupils' time is given to agriculture. Manual instruction on the farm and in the workshops is a prominent feature. The opinion in Australia appears to be that a strictly "vocational" curriculum is a mistake.

(e) Schools of practical agriculture with farms.

This class includes the French Ecoles Pratiques d'Agriculture, and they do not seem to have been successful in attracting the farming class of student.

The general conclusions of the author may be summarised as follows :—

1. No foreign or colonial system is suitable for adoption *en bloc* in this country (England).

Mr. Greig points out that, since the general farm practice—so far as manual processes are concerned—in England and Scotland is superior to that of any other country, education there should be directed to instruction in the methods and systems of farming, and to such objects as improvement of land, crops, and stock. A school in which a large portion of the time is devoted to instruction in such matters as ploughing, stacking, or hedging is not needed.

2. Secondary and other schools with an agricultural bias will succeed best where the larger proportion of the pupils intend to follow agriculture : provided that masters with proper qualifications can be obtained, and that no attempt is made to teach the *art* of agriculture.

3. As an ideal organisation Mr. Greig suggests that the best results would be obtained from an institution which combined the following features :—

(1) A winter school for men ; (2) a summer school for women ; (3) headquarters of an itinerant staff of instructors ; (4) a demonstration centre ; and linked thereto (5) a secondary school with an agricultural side.

The author advocates the inclusion—on the French model—of moral and civic teaching in the curriculum of agricultural education, and lays great stress on the need for teaching business methods through instruction in book-keeping.

4. Finally, attention is invited to the advantages of itinerant work when put into the hands of a really capable instructor,

THE WHEAT MARKET.

Commenting on the wheat position, under date London, May 30th, *Beerbohm's Corn Trade List* states:—"There is no improvement in the demand for cargoes, either for the United Kingdom or the Continent, the fine and forcing weather experienced this week in the United Kingdom, France, and other Continental countries counteracting the effect of less favorable crop advices from North America.

"Shipments last week were very large, viz., 1,755,000 quarters for Europe, and therefore decidedly above the consumptive requirements, large as the latter are now estimated at. This week's exports are also expected to be quite liberal, but not so large as in the two preceding weeks, whilst throughout the month of June both North America and India will, no doubt, ship very freely. The exports from these two sources, added to moderate totals from Russia, the Argentine, and Australia, will most likely result in the weekly shipments being in excess of the requirements for some time to come, and will tend to keep the demand very quiet, especially if seasonable weather be experienced in the future.

"Whilst there can be no doubt that crop prospects have deteriorated in the United States during the past fortnight, and more particularly so in Kansas (the most important of all the winter wheat States), there is great difference of opinion as to whether the damage done in that State has been sufficient to reduce the total winter wheat yield seriously or not. With ordinary climatic conditions in the future it would appear almost certain that the yield will exceed last year's by nearly 100 million bushels, and this will go a long way towards making up for any possible deficiency in the spring wheat crop. It will be remembered that last year weather conditions were almost perfect for the crop in the spring wheat States, and it is hardly to be expected that such favorable conditions will obtain this year. Receipts at western points continue in excess of last year's figures, but, with exports continuing on a large scale, there was a further very large decrease in the visible supply.

"The final official crop report for the whole of India has now been received, and the outturn proves to be decidedly larger than previously expected, the yield being estimated at 44,786,000 quarters, against 45,800,000 quarters last year, or 1,000,000 quarters less than in 1912. The crops and exports of the past nine years have been as follows (in quarters of 480lbs.):—

	Crop.		Exports following
	Qrs		12 months.
			Qrs
1913	44,800,000	..	?
1912	45,800,000	..	*7,590,000
1911	46,300,000	..	6,065,000
1910	44,600,000	..	5,860,000
1909	35,375,000	..	4,635,000
1908	27,880,000	..	485,000
1907	39,000,000	..	3,975,000
1906	40,000,000	..	3,590,000
1905	35,000,000	..	4,250,000
1904	44,700,000	..	10,035,000
Yearly average 1904/1912.	39,850,000	..	5,165,000

Making allowance for increased home consumption, it would appear pretty certain that there must still be fair reserves of old wheat in India, and there can be little doubt that India can spare almost as much wheat as exported in the 12 months ended March 31st, 1913, provided the wheat is wanted and prices are sufficiently attractive."

* Including 6,076,000 quarters from Kurrachee, 867,000 quarters from Bombay, and 628,000 quarters from Calcutta,

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
June 6	Quiet, with easier tendency	$3/7$ to $3/7\frac{1}{2}$	3/8	$3/7\frac{1}{2}$
7	Steady, but quiet	Do.	Do.	Do.
9	—	$3/7$ to $3/7\frac{1}{2}$	$3/7\frac{1}{2}$ to $3/7\frac{3}{4}$	$3/7\frac{1}{2}$ to $3/7\frac{3}{4}$
10	Steady, quiet; Liverpool neglected, lower	Do.	Do.	Do.
11	Very dull, lower, no demand; Liverpool steady, quiet	$3/7$ to $3/7\frac{1}{2}$	$3/7\frac{1}{2}$	$3/7$ to $3/7\frac{1}{2}$
12	Dull, easier tendency; Liverpool very dull	Do.	Do.	Do.
13	Steadier tone, little inquiry; Liverpool steady, no quotation	Do.	Do.	Do.
14	Steady, but quiet; Liverpool dull and neglected	Do.	Do.	Do.
16	—	$3/7$	Do.	Do.
17	Very dull and lower; Liverpool very dull	Do.	Do.	Do.
18	Steady, but quiet; Liverpool quiet	Do.	Do.	Do.
19	Dull, easier tendency	Do.	Do.	Do.
20	Quiet	Do.	Do.	Do.
21	Quiet; Liverpool dull, easier tendency	Do.	Do.	Do.
23	—	Do.	Do.	Do.
24	Dull, easier tendency	Do.	Do.	Do.
25	Do.	Do.	Do.	Do.
26	Dull	Do.	$3/7$ to $3/7\frac{1}{2}$	Do.
27	Dull, easier tendency; Australian arrived, bought at $4/7\frac{1}{2}$	Do.	Do.	$3/7$
28	Quiet; Liverpool dull, offered lower	Do.	Do.	Do.
30	—	Do.	$3/7\frac{1}{2}$	$3/6\frac{1}{2}$
July 1	Dull	$3/6\frac{1}{2}$ to $3/7$	Do.	Do.
2	Dull and neglected	$3/6\frac{1}{2}$	$3/7$	$3/6\frac{1}{2}$
3	Do.	$3/6$ to $3/6\frac{1}{2}$	Do.	Do.

STEAMER FREIGHTS.—(July 1st)—Steamers from South Australia to United Kingdom—Continent, full cargo rates, 30s. to 31s. 3d. per ton ($9\frac{3}{4}$ d. to 10d. per bushel); to South Africa, 27s. per ton ($8\frac{1}{2}$ d. per bushel). Parcels, Port Adelaide to London-Liverpool, 30s. per ton ($9\frac{3}{4}$ d. per bushel); to Continent, 30s. per ton ($9\frac{3}{4}$ d. per bushel); Port Adelaide to Melbourne, 8s. per ton ($2\frac{1}{2}$ d. per bushel); to Sydney, 10s. 6d. per ton (31d. per bushel).

SAILER FREIGHTS.—From South Australia to United Kingdom—Continent, 30s. per ton ($9\frac{3}{4}$ d. per bushel); to South Africa, 26s. 3d. per ton ($8\frac{3}{4}$ d. per bushel).

RAINFALL TABLE.

The following table shows the rainfall for June, 1913, at the undermentioned stations, also the average total rainfall for the first six months in the year, and the total for the first six months of 1912 and 1913 respectively:—

Station.	For June, 1913.	A'v'ge. To end June.	To end June, 1913	To end June, 1912.	Station.	For June, 1913.	A'v'ge. To end June.	To end June, 1913.	To end June, 1912.
Adelaide ...	0.58	10.11	6.39	7.60	Hamley Bridge	0.30	8.02	5.45	3.43
Hawker	0.05	5.83	2.48	4.74	Kapunda ...	0.22	9.11	8.07	3.91
Cradock	0.13	5.42	2.93	2.49	Freeling ...	0.20	8.39	9.83	3.94
Wilson	0.13	5.83	3.02	4.77	Stockwell ...	0.16	9.32	7.78	4.84
Gordon	0.13	8.05	2.93	3.10	Nuriootpa ..	0.14	9.80	7.24	4.46
Quorn	0.23	6.37	2.44	7.15	Angaston ...	0.27	9.82	10.18	6.39
Port Augusta	0.13	4.85	2.36	4.04	Tanunda ...	0.29	10.26	9.21	7.26
Port Germein	0.22	6.27	2.34	3.36	Lyndoch ...	0.33	10.41	7.20	6.09
Port Pirie ..	0.46	6.47	2.89	3.49	Mallala	0.29	8.24	5.18	4.12
Crystal Brook	0.34	7.17	2.28	4.94	Roseworthy..	0.20	8.33	5.70	3.92
Pt. Broughton	0.63	7.02	2.36	5.47	Gawler	0.20	9.15	5.63	4.25
Bute	0.47	7.27	4.37	3.96	Smithfield ..	0.23	8.26	5.77	4.64
Hammond ..	0.18	5.22	2.32	3.14	Two Wells ..	0.10	8.37	4.28	3.72
Bruce	0.16	4.30	3.12	4.07	Virginia.....	0.27	8.64	4.83	4.03
Wilmington ..	0.27	8.24	3.07	8.10	Salisbury ...	0.20	9.03	6.09	5.36
Melrose	0.43	10.84	3.44	7.97	Teatree Gully	0.37	13.91	6.72	9.02
Booleroo Cntr.	0.16	7.32	2.09	4.08	Magill	0.41	12.77	7.00	8.37
Wirrabara...	0.54	8.67	3.54	6.04	Mitcham ...	0.77	11.60	6.55	7.02
Appila	0.34	6.86	2.47	8.25	Crafrers	1.37	21.79	11.69	13.62
Laura	0.42	7.90	2.50	4.29	Clarendon ..	0.58	16.13	8.32	9.14
Caltowie	0.32	7.63	3.10	3.94	Morphett Vale	0.26	11.45	6.50	6.06
Jamestown ...	0.33	7.59	3.27	6.30	Noarlunga ..	0.28	9.84	4.98	5.60
Gladstone ...	0.59	7.06	2.81	3.85	Willunga ...	0.42	12.22	8.50	7.46
Georgetown...	0.65	8.50	2.86	5.26	Aldinga	0.27	10.11	6.54	5.30
Narridy	0.29	7.95	2.01	5.03	Normanville	0.85	10.00	7.11	5.08
Redhill.....	0.62	7.77	3.83	5.55	Yankalilla...	1.21	11.51	9.25	6.57
Koolunga....	0.47	7.31	2.73	4.69	Rudunda	0.17	7.77	7.20	5.74
Carrieton ...	0.12	5.52	2.30	3.29	Sutherlands	0.01	—	4.03	4.24
Eurelia	0.23	5.99	1.99	4.76	Truro	0.23	8.74	10.27	6.34
Johnsburg ...	0.19	4.41	2.34	4.33	Palmer	0.08	—	7.19	4.51
Orroroo	0.19	6.59	2.76	4.55	Mt. Pleasant.	0.22	12.47	8.23	5.44
Black Rock...	0.13	5.80	2.80	3.64	Blumberg ..	0.32	13.93	4.21	6.26
Petersburg ...	0.13	6.04	4.56	5.06	Gumeracha ...	0.57	15.42	7.45	7.84
Yongala	0.18	6.23	2.51	3.81	Lobethal ...	0.59	16.46	7.63	7.39
Terowie	0.12	5.95	3.32	4.31	Woodside ...	0.62	14.26	8.19	6.97
Yarcowie ...	0.13	6.18	4.43	4.90	Hahndorf ...	0.53	16.03	9.47	6.78
Hallett	0.61	7.25	4.45	4.55	Nairne	0.52	13.27	7.94	6.01
Mount Bryan	0.63	7.01	5.66	4.45	Mt. Barker ..	0.64	13.91	9.26	6.60
Burra	0.35	8.10	4.33	5.77	Echunga ...	0.79	15.32	8.54	8.39
Snowtown ...	0.37	7.38	3.77	5.19	Macclesfield..	0.42	13.40	10.35	6.80
Brinkworth ...	0.65	7.05	3.87	4.81	Meadows.....	0.69	16.34	10.72	9.40
Blyth	0.48	7.77	4.26	4.53	Strathalbyn..	0.31	8.76	8.32	5.50
Clare	0.70	11.11	5.83	6.99	Callington ...	0.28	7.15	6.27	3.22
Mintaro Cntrl.	0.31	9.93	4.60	4.53	Langh'me's B.	0.39	7.06	5.35	3.83
Watervale...	0.55	12.72	7.84	6.93	Milang	0.36	8.24	4.59	3.91
Auburn	0.42	11.08	4.90	5.07	Walleroo ...	0.37	7.12	4.24	5.79
Manoora ...	0.34	8.34	4.26	4.32	Kadina	0.47	7.94	3.85	5.53
Hoyleton ...	0.34	8.80	3.31	3.10	Moonta	0.50	7.81	4.42	5.28
Balaklava ..	0.26	7.81	3.23	3.20	Green's Plns..	0.44	7.53	3.26	3.72
Pt. Wakefield	0.34	6.82	3.53	3.97	Maitland ...	0.38	9.87	5.49	5.03
Saddleworth..	0.36	9.48	5.04	4.06	Ardrossan ..	0.31	6.87	4.49	4.51
Marrabel ...	0.26	8.95	5.24	3.16	Pt. Victoria..	0.35	7.68	3.08	4.80
Riverton ...	0.36	9.64	6.31	4.19	Curramulka...	0.53	8.82	4.79	3.88
Tarlee	0.32	8.31	5.85	4.26	Minlaton ...	0.57	8.48	3.64	3.42
Stockport ..	0.19	7.70	5.85	3.51	Stansbury....	0.55	8.07	5.34	5.10

RAINFALL TABLE—continued.

Station.	For June, 1913.	A'v'ge to end June.	To end June, 1913.	To end June, 1912.	Station.	For June, 1913.	A'v'ge. to end June.	To end June, 1913.	To end June, 1912.
Warooka....	0.68	8.23	3.72	4.07	Bordertown...	0.17	8.96	6.44	4.19
Yorke town .	0.61	8.34	3.48	4.69	Wolseley ...	—	8.00	5.19	3.87
Edithburgh .	0.55	8.07	5.00	4.32	Frances ...	0.37	8.67	5.30	5.88
Fowler's Bay.	0.24	6.55	5.40	5.49	Naracoorte ...	0.50	10.05	6.51	6.60
Streaky Bay.	0.26	7.70	5.35	5.87	Lucindale ..	0.73	10.28	5.19	6.98
Port Elliot.	0.57	8.00	3.08	5.72	Penola.....	0.86	11.92	6.44	9.50
Port Lincoln.	0.58	9.56	4.31	9.06	Millicent ...	1.85	13.77	9.74	9.61
Cowell	0.13	5.86	2.62	5.78	Mt. Gambier .	0.92	14.18	9.13	11.33
Queenscliffe...	0.02	18.92	5.05	5.35	Wellington .	0.21	7.28	5.68	3.92
Port Elliot ...	0.53	9.89	6.02	5.69	Murray Brdg.	0.38	6.75	8.62	3.44
Goolwa.....	0.48	8.47	5.84	6.39	Mannum ...	0.05	5.83	5.66	3.10
Meningie ...	0.86	8.92	5.81	4.90	Morgan	0.02	4.35	3.06	3.81
Kingston.....	0.81	11.70	7.28	11.03	Overind. Crnr.	—	5.44	5.83	4.42
Robe	1.02	—	6.04	7.09	Renmark ...	—	4.89	6.02	4.21
Beachport...	1.53	13.05	8.54	7.65	Lameroo ...	0.05	—	6.74	6.55
Coonalpyn ..	0.25	7.91	6.02	5.29	Tintinara ...	0.31	—	—	—

DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Department reports on July 1st—

BUTTER.—The supply of cream received at the factory for the month of June was very satisfactory, being above the average for the period of the year, and the quality was excellent. Prices ranged from 1s. 2½d. to 1s. 4½d. for superfine, and 1s. 1½d. to 1s. 3½d. for pure creamery. The present rates are, superfine, 1s. 4½d.; pure creamery, 1s. 3½d. There is every prospect of the prices easing shortly.

A. W. Sandford & Co., Limited, report on July 1st—

BUTTER.—The June markets were brisk, and values in butter firmed appreciably. The increase in quantities compared with the corresponding period of last year, as reported last month, continues. Best factory and creamery butter, fresh in prints, sold at from 1s. 2d. to 1s. 4½d. per lb.; choice separators and dairies, 1s. 1½d. to 1s. 2½d.; store and collectors, 1s. 0½d. to 1s. 1d. per lb.

EGGS.—Good local business has been put through, but owing to export trade being rather on the dull side values are a little easier, the closing price for the month being 1s. 4d. per dozen for guaranteed new-laid hen; duck, 1s. 4½d.

CHEESE.—Quotations rule a shade higher, and the better tone obtaining since the beginning of June has practically maintained, with good turnover for prime mellow make. Quotations are 6½d. to 7d. for large to loaf.

HONEY.—Rates are unaltered; all parcels coming forward find ready quittance at 2½d. to 3d. for prime clear extracted.

ALMONDS.—The demand keeps brisk, there being very few offering. Brandis 5½d.; mixed soft shells, 5d.; hard shells, 3d.; kernels, 1s. 3d.

BACON.—Local curers are still having difficulty in obtaining the requisite number of live hogs, and shipments from the other States continue to find their way to this market. The trade in middles and sides has been good. Best factory-cured sides, 9½d. to 10½d. per lb.; hams, 9d. to 10d.; farm middles and rolls, 7d. to 9d.; country hams, 8d. to 10d.

LIVE POULTRY.—Supplies during the month have kept up remarkably well, and for all birds fit to kill good prices have been secured. Good table roosters brought 2s. 6d. to 3s. each; plump hens and nice-conditioned cockerels, 1s. 9d. to 2s. 3d.; small and light, 1s. 3d. to 1s. 6d.; ducks, 2s. 6d. to 3s. 6d.; geese, 4s. 6d. to 5s. 6d.; pigeons, 7½d.; turkeys, from 7d. to 9½d. per lb. live weight for fair to good table birds.

POTATOES AND ONIONS.—Potatoes continue to be very plentiful, and prices have suffered a further decline during the past few weeks. The Ballarat crop is evidently much heavier than was anticipated a few months ago, and sellers in that district are exceedingly anxious to effect sales either for immediate or forward delivery. Onions—Locally-grown onions are still sufficient to serve the requirements of the Adelaide market, and there is no alteration to report in prices, but inter-State markets are decidedly firmer. Quotations are—Potatoes—Gambiers, £4 10s. per ton of 2,240lbs. on trucks, Adelaide or Port; 5s. 6d. per cwt. in the market. Onions—Gambiers, £7 10s. per ton of 2,240lbs. on trucks, Adelaide or Port; locals, 7s. to 8s. per cwt. in the market.

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		July.	Aug.			July.	Aug.
Amyton	1408	—	—	Greenock	*	—	—
Angaston	*	12	16	Green Patch	*	14	11
Appila-Yarrowie	*	—	—	Gumeracha	† ‡	15	12
Arden Vale & Wyacca ..	*	—	—	Hartley	*	16	13
Arthurton	*	—	—	Hawker	1408-9	14	11
Balaklava	†	—	—	Hookina	1409	15	12
Beetaloo Valley	*	—	—	Hooper	1438	12	—
Belalie North	1411	12	16	Inman Valley	†	—	—
Berri	†	19	16	Ironbank	1449	18	15
Blackwood	1444	14	11	Julia	1415	19	16
Blyth	1426	19	16	Kadina	*	15	12
Booloroo Centre	1411	11	—	Kalangadoo	*	12	9
Borrika	1436	—	—	Kanmantoo	*	12	16
Bowhill	*	—	—	Keith	*	19	16
Bowmans	*	17	14	Kingscote	*	1	5
Burra	†	18	15	Koppio	1432	17	14
Bute	1430	—	—	Kybybolite	*	17	14
Butler	*	—	—	Lameroo	*	—	—
Caltowie	*	12	16	Leighton	1416	—	—
Canowie Belt	1412	—	—	Lipson	*	—	—
Carrieton	*	17	14	Longwood	1449	16	13
Cherry Gardens	1447	15	12	Loxton	*	—	—
Clanfield	*	—	—	Lucindale	*	19	23
Clare	1427	18	15	Lyndoch	†	17	14
Clarendon	1447	14	11	MaeGillivray	1450	—	12
Claypan Bore	1436	15	12	Maitland	*	3	7
Colton	1430	19	16	Mallala	*	7	4
Coomandook	*	—	—	Mangalo	1432	19	16
Coomooroo	†	19	16	Mannum	*	26	30
Coonalpyn	*	—	—	Meadows	1451	14	—
Coorabie	† ‡	—	—	Meningie	1451	19	16
Craddock	*	—	—	Millicent	1454	8	12
Crystal Brook	1413	—	—	Miltalie	1433	12	16
Davenport	*	—	—	Minlaton	†	17	14
Dawson	*	—	—	Mitchell	*	19	16
Dingabledinga	*	11	8	Monarto South	1439	19	—
Dowlingville	*	—	—	Monteith	1439	—	—
Elbow Hill	1431	—	—	Moonta	1430	19	—
Forest Range	1448	17	14	Moorlands	*	—	—
Forster	*	—	—	Morchard	*	—	—
Frances	*	18	15	Morgan	1440	12	—
Freeling	*	—	—	Morphett Vale	1452	—	—
Friedrichswalde	*	—	—	Mount Barker	*	16	13
Gawler River	1428	—	—	Mount Bryan	†	12	16
Georgetown	1414	19	16	Mount Bryan East ..	1417	5	2
Geranium	1437	26	30	Mount Gambier	1455	12	—
Gladstone	1414	—	—	Mount Pleasant	1452	11	8
Glencoe	1453	—	—	Mount Remarkable ..	*	16	13
Goode	†	—	—	Mundoora	*	—	—

INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings	
		July.	Aug.			July.	Aug.
Nantawarra	*	16	13	Spalding	*	18	15
Naracoorte	1455	12	9	Stockport	†	—	—
Narridy	*	—	—	Strathalbyn	1453	—	—
Narrung	1453	—	—	Sutherland	1441	12	—
North Booborowie ..	1417	—	—	Tarcowie	*	—	—
Northfield	†	1	5	Tatiara	1456	5	2
Orroroo	*	12	—	Tintinara	*	—	—
Parilla Well	*	—	—	Two Wells	1429	—	—
Parrakie	1440	5	2	Uraidla and Summert'n	1453	7	4
Paakeville	*	17	14	Utera Plains	1434	12	16
Penola	1455	5	2	Waikerie	1442	14	11
Penong	*	12	9	Warcovie	1410	—	—
Petina	1433	19	—	Watervale	†	—	—
Pine Forest	*	15	12	Wepowie	1410	—	—
Pinnaroo	1440	—	—	Whyte-Yarcowie	1421-2	—	—
Port Broughton	1418	18	15	Wilkawatt	1442	—	—
Port Elliot	*	19	16	Willowie	*	4	8
Port Germein	1418	19	9	Willunga	*	5	2
Port Pirie	1419	5	2	Wilmington	1411	16	13
Quorn	1409	19	—	Wirrabara	†	—	—
Redhill	1420	15	12	Wirrega	1456	—	—
Renmark	*	—	—	Woodside	†	16	—
Riverton	†	—	—	Yabmana	1435	—	—
Roberts and Verian ..	†	15	12	Yadnarie	1436	12	16
Saddleworth	*	18	15	Yallunda	*	—	—
Salisbury	1428	1	5	Yongala Vale	1425	14	11
Shannon	1434	—	—	Yorke town	*	12	9
Sherlock	*	—	—				

* No report received during the month of June. † Formal report only received.
‡ Report omitted owing to pressure on space.

NOTE RE ANNUAL MEETINGS.

As many Branches will now be holding their annual meetings, the reports of same will be treated as formal unless some other business is also dealt with. When, however, matters of agricultural interest are discussed and the record is printed, a resume of the annual report will also be included if space permits.

ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—
August 13th and September 10th.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD.)

Amyton, June 17.

PRESENT.—Messrs. T. O'Donoghue (chair), W. Gum, S. Thomas, T. Ward, R. Brown D. P. Aitken, A. J. Phillis, M. Corcoran, A. Crisp (Hon. Sec.), and one visitor.

COMMENCING FARMING.—A paper written by Mr. Hawke, of the Willowic Branch, was read by the Hon. Secretary. In discussing the subject, Mr. W. Gum preferred the share system of farming in a good district. The farmers' liabilities were not so heavy. It was an exceptional case, he thought, where bullocks would be allowed on the share farm, and he thought that the share farmer would have to work horses, which would cause his initial outlay to be heavier. Mr. Ward thought the young man with grit and determination would do best by going out into the new hundreds. His experience with the share system had not been favorable. Mr. Brown agreed, and members generally thought that the share farmer paid a high rental for the land he occupied.

Hawker, May 27

(Average annual rainfall, 12·22in.)

PRESENT.—Messrs. G. H. Wright (chair), J. Palin, A. H. Rhymer, G. Moller, W. J. Pymon, B. Mansom, and J. Smith (Hon. Sec.).

SHEEP ON THE FARM.—Dealing with this subject in a paper, the Chairman said sheep were very useful in keeping down the weeds on fallow. The most suitable class to keep was three-year-old Merino ewes, with large frames and a good covering of wool. Plain-bodied sheep were preferred, as they were much easier to shear. These should be mated with good Shropshire rams in December. The lambs would then be dropped in May and June, the most suitable time in this district, as green feed was then generally available. The number kept on the holding would be determined by the season, but the maximum number that could be kept in good condition should be held. Twenty or 30 tons of hay would provide a good safeguard against unforeseen shortages, which might otherwise cause the farmer to sell at a low figure. A sheep should do well on 2lbs. of hay per day; 30 tons would feed 500 sheep for nearly 10 weeks. If a dry spell occurred, the farmer would be fortunate if he were able to sell them at 10s. per head, but £90 expended in the purchase of 30 tons of hay would enable him, in the ordinary course of events, to tide them over the short period, and sell at about 20s. per head, a net gain of £160. Continuing, the paper read—"Taking this class of sheep as a basis, and of course kept well, I think the profits should work out somewhat as follows:—Wool per ewe, 8lbs. at 8d. per pound, 5s. 4d.; 75 per cent. of lambs at 8s. per head, 6s., a total of 11s. 4d. per head of ewes kept—£283 6s. 4d. on 500 sheep. The expenses would be about—Shearing at

23s. per 100, £5 15s. ; bales, £2 ; rail carriage on wool, approximately £4 ; commission on sale of wool, £3 5s. ; commission on sale of 375 lambs, £7 10s. ; rail carriage on four trucks of lambs, £25 18s., total £48 8s. : leaving a profit of £234 18s. 4d. This profit is a moderate one, and should be attained under present conditions by any intelligent farmer. In conclusion, I would advise every farmer in this district to keep a hundred sheep or more, as they will save him 50 per cent. on his butcher's bill." The Hon. Secretary thought it more profitable to keep the pure Merino. The lambs of the Merino-Shropshire cross were difficult to get into condition for marketing, and if carried over did not yield so well as the Merinos for wool. Mr. Pyman agreed.

Hawker, June 17.

(Average annual rainfall, 12'22in.)

PRESENT.—Messrs. G. H. Wright (chair), A. H. Rhymmer, J. Palin, W. J. Pyman, C. W. Pumps, and J. Smith (Hon. Sec.).

THE AGRICULTURAL BUREAU.—The article appearing in the May issue, page 1129, of the *Journal* dealing with the working of Branches of the Agricultural Bureau was read by the Hon. Secretary. Mr. Wright mentioned that the suggestion contained therein that Branches should do more in the direction of experimenting was one that should receive every consideration. Members expressed the opinion that good could be done in this district by the conducting of a series of wheat variety tests.

Hookina, May 27.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. D. Madigan (chair), L. Woods, B. Sheridan, P. Henschke, J. Carn, J. Henschke, B. Murphy, S. Stone (Hon. Sec.), and two visitors.

FARM TOOLS.—The following paper was read by Mr. B. Sheridan :—" All farms should have a repairing outfit, especially in a district like our own, where one has to travel a good distance to a general smith, and then runs the risk of finding him too busy to attend to the work at once. My experience in the bush convinces me that it would pay in the long run to invest in a few handy tools which would, with a little practice, enable the farmer to do most of his repairing at home, without loss of valuable time in the busy season. Trouble is sometimes caused by a simple breakage, such as a $\frac{3}{4}$ in. swing eyebolt. There are several types of forge. With one of these at least three pairs of assorted tongs, a 60-lb. anvil, and a $4\frac{1}{2}$ -in. jaw leg vice are needed. These form the foundation of a farmer's repairing shop. There should also be a hand hammer, claw hammer, shoe hammer, cold chisel, square and round punch, assorted files, ratchet brace, jack plane, rule, rip and cabinet saws, 66ft. tape, plumb spirit level, snips, pliers, oilstone, trowel, soldering iron, steel square, set of taps and dies from $\frac{3}{16}$ in. to 1in., and a small drilling machine with a set of twist drills from $\frac{1}{16}$ in. up to 1in. This is without doubt one of the most useful machines any man could have." Members agreed that in a district like this, where long distances had to be traversed to reach a smith, it was almost a necessity to possess a set of repairing tools as mentioned in the paper. Frequently much time and money were in this way saved to the outback farmer.

Quorn, June 14.

(Average annual rainfall, 13'78in.)

PRESENT.—Messrs. A. F. Noll (chair), Brewster, Britza, Schulze, Cook, Bury, Jago, and C. Patten (Hon. Sec.).

WHEATEN CHAFF FOR HORSES.—In a short paper under this heading Mr. Brewster expressed the view that, fed by itself, wheaten chaff was of no value, excepting, perhaps, to keep stock from starvation. The addition of pollard, treacle, or crushed wheat, however, made it quite equal to or even better than hay chaff. This season he had fed two horses on wheaten chaff and pollard, mixing about 6lbs. of the latter to a bran bag of the former, and four horses on hay chaff alone. The two fed on wheaten chaff and pollard did much better than the latter. The mixing of the pollard or crushed wheat with the chaff entailed a good deal of work, as the chaff required to be thoroughly damp or trouble was likely to be experienced with the stock. Mr. Britza made a practice of giving bran and pollard

in equal quantities with wheaten chaff. During bad seasons the cocky chaff would be found nearly as good as hay. Mr. Cook had found that cows did better when fed on hay chaff mixed with wheaten chaff, as they seemed to be able to ball the feed and chew the cud better. Mr. Jago was feeding his horses on wheaten chaff at the present time, and Mr. Bury thought that with a little bran and pollard added, it was better for cows than hay chaff. Mr. Schulze preferred cocky chaff mixed with hay chaff. The Hon. Secretary agreed that it was advisable to save as much wheaten chaff as possible, and with this in view during the last two seasons he had stripped his crops. The Chairman was holding a supply of cocky chaff, which he intended feeding to ewes, lambs, and other stock with green feed when a supply was available. In reply to a question, Mr. Brewster said wheaten chaff was worth 6d. per bag.

Warcowie, June 18.

(Average annual rainfall, 12in.)

PRESENT.—Messrs. T. Donnellan (chair), A. Bairstow, Ryan, Marrow, Telfer, Growden, Bennett, Hilder, W. Sanders, B. Crossman, P. Donnellan, E. Jarvis, J. Feindler (Hon. Sec.), and 70 visitors.

MAKING FARM LIFE ATTRACTIVE.—In speaking on this subject Mr. Telfer mentioned that it was advisable for the farmer to spend a few hours occasionally in some sport or entertainment of his choosing. Recreation was necessary, especially among the younger people on the farm. Too often one heard the complaint "Oh, I don't like farm work. I will endeavor to get employment in the city, where I can get my time off now and again." A little experimental work provided a matter of interest and instruction. Time spent in visits to the Adelaide and country shows, the Annual Congress, and Conferences of Agricultural Bureau was by no means lost to the farmer.

Wepowie, May 26.

(Average annual rainfall, 13in. to 14in.)

PRESENT.—Messrs. C. Halliday (chair), C. Knauerhase, J. E. Pearce, G. Rooke, J. Crocker, G. Goss, J. and T. F. Orrock (Hon. Sec.).

THE AGRICULTURAL BUREAU.—The following paper was read by the Hon. Secretary :—
 "The Agricultural Bureau of South Australia has, during the past few years, made rapid progress. We hardly realise the immense benefit it has been and is to the producers. To-day there are more branches of the organization than ever before in its history, which in itself is evidence that its usefulness is recognised by the producers. Some people consider attending a Bureau meeting so much waste time: but even the most experienced can hear many good ideas, tried and untried, on different subjects. Certainly a man can learn a lot by personal experience, but if he is a member of the Bureau he may often find that some difficult problem he is trying to solve has already been mastered by a fellow member. If not, he can obtain expert advice through the Advisory Board of Agriculture. The Bureau is really a benefit society for producers, so all should do their best to make the meetings as attractive and interesting as possible. As it is now seeding time I suggest that each member sets apart an acre or two for experimenting with different quantities of super., say from ½wt. to 2cwts. per acre. Probably members are using several different sorts of phosphate. In my opinion a crop that will thrive with a heavy dressing of one sort of manure will not do well with a different kind. If this suggestion is carried out they can report on their respective plots at each meeting during the season. There are no trade secrets attached to farming, therefore the success of one farmer depends largely upon the success of his neighbor. It rather flatters a member of the Bureau to see his methods being copied. The Agricultural Bureau is largely responsible for most of the scientific methods of farming in vogue in South Australia at the present time. Our Branch has never had a homestead meeting nor a social evening. That is something for us to arrange in the future. An afternoon spent on a farm inspecting stock, crops, machinery, and different improvements would be pleasant and profitable. We should take more interest in the district conferences than we do. They help to bring the Agricultural Department into direct relation with the producer, thus enabling a producer to get expert help on any particular phase of production."

Wilmington, June 18.

(Average annual rainfall, 18.26 in.)

PRESENT.—Messrs. J. Hannagan (chair), D. and S. George, Scholefield, J., G., and W. Schuppan, Zimmermann, Noll, Benier, Slec, and Jericho (Hon. Sec.).

MAINTAINING INTEREST IN BUREAU MEETINGS.—Mr. Scholefield read the following paper:—"It seems to me that our meetings are somewhat dull, monotonous, and lacking in enthusiasm so essential to success and real usefulness. Seeing that we are a community chiefly engaged in farming, combined with a fair amount of dairying and grazing, the small percentage of farmers, particularly the younger generation, who take a keen interest in the work of this Branch of the Bureau is very noticeable. The Department of Agriculture of this State is in existence for the special benefit of all on the land. Its aims and objects are to educate and supply the latest teachings and methods for the benefit of the most important section of the community, viz., those on the soil, and also for the direct benefit of the State itself. No one can deny the usefulness of the various Bureau reports as a means of disseminating knowledge amongst farmers and others. The *Journal of Agriculture* is an excellent medium, containing articles written by up-to-date scientific men, and men of many years' practical experience, which should be of great help to those on the land. Every young farmer in the State should subscribe to it. It may be considered worth while by this Branch of the Bureau to take some steps to induce our younger men on the land to take some interest in the work of this Branch. I consider this Branch does not take sufficient advantage of available opportunities, such as inviting experts to lecture. These men no doubt could open up fresh channels for thought and discussion. The 'homestead meeting' is good, and well worthy of trial. It would create a feeling of healthy rivalry amongst farmers and others, a desire to improve on the other man's surroundings, and useful points could be gleaned by visiting neighbors' homesteads. An occasional social event for the members, their wives, sons, and daughters would also greatly help to maintain the interest, and perhaps be the means of drawing younger men in as members. We may also very well consider a more suitable place for the holding of our meetings, where a library containing books of reference could be started. The strict observance of punctuality is a very important matter at our meetings. Neglect of this is unbusinesslike, and may frequently be the means of keeping out the smart, up-to-date man who places the proper value on time; therefore, be punctual."

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

Belalie North, May 17.

(Average annual rainfall, 16 in. to 17 in.)

PRESENT.—Messrs. A. H. Warner (chair), J. Arndt, I. Gullidge, D. Fox, W. Cummings (Hon. Sec.), and three visitors.

DISC CULTIVATORS.—In introducing a discussion on this subject, Mr. I. Gullidge said the disc cultivator was a fine implement for working the fallow, making a splendid seed bed. It cut and turned the weeds down, and he had found that it did best work when cutting at a depth of about 2 in. Mr. Warner stated that this implement was not suitable for use on rough or stony ground.

Booleroo Centre, June 6.

(Average annual rainfall, 15.83 in.)

PRESENT.—Messrs. L. F. Powell (chair), W. H. Nottle, sen., W. Whibley, H. A. Schmitz, H. Sanders, A. Schmitz, J. Repper, B. Nottle, J. Carey, jun., N. Keahne, B. Giddings, J. H. Repper, W. H. Giddings, H. C. Jaeschke, H. E. Kirkland, N. L. Brooks, O. E. W. Burns (Hon. Sec.), and two visitors.

FALLOWING.—Dealing with this subject in a short paper, Mr. J. H. Repper said the best practice was to fallow the land every three years and so enable it to accumulate the necessary plant food for the production of a crop. The stubble could be left for a while to provide feed for stock. The months of July and August were the most suitable for fallowing; this would give the weeds an opportunity of making some headway before they were ploughed under. Ploughing should be to a depth of between 4in. and 5in., with an occasional breaking to a slightly greater depth. During a run of dry seasons he had ploughed to a depth of about 6in. The crop immediately following was not as good as that on the other land, but for some years after this a benefit was secured. Harrows should follow the plough, being put on when the soil was in good condition, not too wet, or too dry and hard. Later, the cultivator should be used to destroy weeds, &c. Formerly, no further working was done until seeding, the growth of oats, &c., being fed down with stock; but now the practice was to go over the ground after a fall of rain during the summer. In a paper on this subject, Mr. N. L. Brooks said it was important to ensure a successful fallowing with a minimum of expense and labor to obtain the best plough available. A five-furrow implement was the most suitable, and ten good horses were required for this, four being worked as leaders. This gave a straight draught, and only one horse was walking on the ploughed ground. Coulters served no useful purpose in sticky soils, but where the ground was sandy, they could be used with advantage on the back plough. This would keep the furrow clean, lighten the draught, and make it easier for the furrow horse to walk. The furrow wheel also would have solid ground on which to travel. In the case of sticky or clayey soils the front of the mouldboards should extend well over the left side of the body of the plough. The coulter bolted to the bottom of the body was better than that clamped to the jump beam and extending downward. Deep ploughing, when the soil would allow of it, was a distinct advantage. Five inches was the best depth.

Canowie Belt, June 20.

(Average annual rainfall, 20·04in.)

PRESENT.—Messrs. E. F. Daly (chair), A. Kitschke, A. Spavin, G. Longbottom, F. M. Schultz, J. Flower, H. A. Wedding, A. F. Dempsey, E. W. Noll, C. J. Wedding, J. Sparks, G. Kirk, F. D. D. Stapley (Hon. Sec.), Messrs. G. Jenkins (President Yarowvie Branch), E. J. Pearce (Hon. Sec. Yarowvie Branch), and C. Fowler, D. Fowler, and E. Fowler (Yongala Vale Branch), and four visitors.

THE AGRICULTURAL BUREAU.—Mr. G. Jenkins delivered an address on the advantages of association with the Agricultural Bureau, outlining its sphere of usefulness, and instancing the good work that had been done by the Branch to which he belonged.

POULTRY ON SMALL HOLDINGS.—In a paper under this heading Mr. E. J. Pearce said the White Leghorn was the best laying breed of fowls, some of the pens at the Roseworthy Egg-Laying Competition having returned 10s. per hen above the cost of keep for the year. But it should be remarked that a large number of the chickens reared would be males, and the White Leghorn cockerel was of little use for table purposes. With the dual-purpose fowl a return for eggs almost equal to that received from the White Leghorns would be received, and the male birds should be worth from 2s. to 3s. each at six months of age. On this account, and because of their quieter dispositions, he favored a good strain of either Silver Wyandottes or Black Orpingtons. The selection of a good strain was essential, and the chicks should be hatched from five to six months before they were required for laying in the case of the lighter breeds, and six to eight months with the heavier breeds. Poultry required access to clean, cool water. If the birds received household scraps—meat, green stuff, &c., a grain diet would perhaps be all right, but grains were rich in fattening substances, and fat hens would not lay well. A bran mash made with bullock's liver soup, was a good ration. Light, shrivelled grain was better than full, plump grain for laying hens. Plenty of green feed was necessary; nothing was better for this than lucerne. Skim or separator milk was a good egg producer. Fowls running at large secured a great variety of food in the shape of worms, grubs, insects, lime, and grit, and this had to be supplied where they were confined. Much of the prejudice against keeping fowls on the farm arose through their natural habit of scratching, and their droppings fouling the horsefeed, harness, vehicles, machinery, &c. The

ravages of the fox and tick also had operated in this direction, consequently the most desirable method was to keep the fowls confined. There were different systems of housing in vogue, i.e., enclosing an area with netting, and using tanks for shelter, and the "manure shed" system, where 10 birds were confined in a small pen 10ft. x 6ft., the floors being covered with 6in. of fresh stable manure, which was renewed every six months. Grain food was forked into this. Where space was a consideration, this system might be tried, but he preferred giving more room. He was putting a high netting fence around a small plantation of trees, and erecting all-iron sheds for shelter. His intention was to deposit hard rubbish within the enclosure, and feed grain on this. Cleanliness, warmth, green feed, and shelter from winds and heat in the order named were the chief requirements of poultry.

SHEEP FOR DISTRICT.—In reply to a question, Mr. Jenkins said the best breed of sheep for this district for freezing was the progeny of the Merino ewe mated with the Shropshire ram. The wool of the crossbred ewe became dirty with grass seeds, whilst the close-woulded Merino did not pick up the seeds to such an extent. Also, the lambing season of the crossbred extended over a much longer period than that of the Merino.

Crystal Brook, May 17.

(Average annual rainfall, 15·62in.)

PRESENT.—Messrs. M. P. Pavy (chair), A. J. Dennis, G. Davidson, W. Hutchinson, A. J. L. Wilson, I. Teakle, G. A. Solomon, J. Pridham, J. H. Dingle, J. Duffield, C. J. Jenner, A. E. S. Clarke, H. Sutcliffe, R. Heaslip, R. R. Shaw, W. W. Lovelock, W. S. Carmichael, W. C. Wood, A. E. Cooke, T. L. Kelly, J. C. Shearer, J. H. Hill, H. S., and E. Billinghamurst, M. Weston, A. MacDonald, B. Weston, G. Gum, W. W. Robinson (Hon. Sec.), and one visitor.

GROWING AND MARKETING HAY.—In a paper on this subject Mr. A. J. Hill emphasized the necessity for prompt attention to all operations in connection with seeding and harvesting. He favored Gluyas as a wheat which made hay of good color, and if left for grain yielded satisfactorily. Wheat sown for hay should not be put in too early, as the weeds grew and resulted in an undesirable undergrowth. The binder should be in readiness to go into the crop without delay, and a few spare parts could be kept on hand with advantage. The crop should be cut when the straw a short distance up from the bottom became white; it should not be left until two-thirds of the length whitened, or there would be insufficient color in the chaff. If cut too green it would be found that the chaff was spongy instead of having a "lively" feeling when squeezed in the hand. Immediately after the binder, the hay should be stooked in long rows, two sheaves deep on each side. If round stooks were to be built, the hay should be left for half a day after the binder; it could even be left for a day and a half without ill effects unless rain fell. The sheaves should be of good size, and not tied too close to the heads. The hay should be thoroughly dry before stacking. If it was to be put into a large stack it should remain in the paddock for three weeks after being mown, unless the weather were very suitable for drying. Hay stacked when too green was likely to sweat; if it would crack at the nodes when bent over there was no danger of this. Iron bars pushed into the centre of the stack would reveal whether it was sweating. The stack should be gradually sprung out to the eaves, and the centre kept as high as possible to run off any water, especially when nearing the roof. The heads should be outward in the roof, as the middle could be kept high without there being the danger of slipping. Thatching should be done immediately after harvest. Mr. Billinghamurst considered Gluyas too wiry for hay. The horses left a considerable amount of it. They, however, readily ate Le Huguenot, which had grown to a height of 6ft. Mr. B. Weston favored Gluyas. Round stooks were best. Mr. Cooke thought farmers only cut for hay that portion of their crops that was unfit for grain. Mr. J. H. Hill favored Gluyas wheat, and Mr. Heaslip mentioned that hay to be fed long required to be cut at an earlier stage than that to be chaffed. King's Early was the best hay variety, and Le Huguenot was good. Round stooks were preferable when they were to remain in the paddock for any length of time. Mr. Carmichael said the first consideration of the chaff merchant with regard to hay was the color. He preferred hay with plenty of grain in it for draught stock. If oats were fed, a considerable saving of chaff could be effected.

Georgetown, March 24.

(Average annual rainfall, 18·32in.)

PRESENT.—Messrs. J. Myatt (chair), McDonald, W. Hill, G. Hill, A. Smallacombe, C. Read, M. Page, A. Erickson, M. J. McAuley, E. Hewitt, A. Thomson, W. J. Freebairn, S. Eyre (Hon. Sec.), and one visitor.

FEEDING AND BREEDING HORSES.—A paper on this subject was read by Mr. G. Hill. After drawing attention to the value of a stack of straw, especially in times when feed was short, the paper continued—"The young horse stock suffer most when there is a shortage of feed, as they generally have to be content with what they can pick up in the paddock. By giving them good feed for the first two years one gets more saleable and much better constituted animals. Foals that are ill-fed for a while after leaving their mothers require almost twice as much feed to get them in good condition, and they do not make such good healthy horses. After being weaned they fall away, get rough in the coat, and in most cases, if there is any complaint about, they are the first to show signs of it. During the last few years some of the breeders have been breeding Shires on the so-called Clydesdales. I think this will tend to improve the breed. Recently, in England, 32 head of pure Shires realised an average price of £454 1s. 10d. It seems as though there is a sure market for a good horse. In a few years we shall see what the results of this crossing will be. Some writers condemn the step, saying that the cross will result in a mongrel. As far as breed is concerned it will certainly be a cross, but should one secure a good horse it will not matter. The good heavy weight horse, with plenty of size, so long as he can move well and has a good body, is best. Some will expect to see every foal so much better or they will at first condemn the cross; but it must be remembered that it is much easier to breed a weed than a good horse. We have had pure bred Clydesdales in this State, imported direct from Scotland, and closely related to the best breeds in that land, and when crossed with the mares we have here at present there has been no improvement in the progeny. Others object to the Shires on the score that they will not be able to have a stud book. I do not think South Australia has enough good horses for it to have a stud book. To run this on good lines we must have only the best horses entered. If we are going to include every horse that is certified sound, of what use will it be? The only way it can be done is to have a board of competent judges and two qualified veterinary surgeons. These could decide which horses were fit to be entered. The stud book mare mated with the same sire does not breed as good a foal as the common mare, nor does the foal sell at such a good price. I have seen stock from the best horses of the State and their progeny from the best mares, and a much better animal is bred from the common mare. As far as my experience goes it is not profitable to pay very high prices for mares. My advice is to use the money in procuring a good stallion, and should he turn out a breeder improvement in all the stock is obtained. If a man has 20 mares with foals he gets the benefit of the good sire in all of them. I advise all those who are raising horses to breed the best. Four good foals are worth six bad ones. They eat less, and will realise more when sold. Mares with foals should not be worked too long without the foals sucking. To let the foal suck when the mare is in a heated condition is often very injurious. Always feed horses well. Do not starve them one day and the next day give them an abundance of good feed. Never shut foals up in a small place without cleaning it out, as standing on wet manure is bad for their feet and legs, and they need exercise." Members generally agreed that care and attention and plenty of feed were well repaid when given to young horses. Bran and oats should be added to the chaff, and, generally, if less chaff and more bran were fed the result would be better.

Gladstone, June 14.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. R. E. Lines (chair), J. H. Sargent, W. Brayley, T. Hollitt, R. Peters, R. A. Humphris, A. Anderson, G. Black, F. Aughey, E. H. Davies, S. Masters, R. Coe, J. Eley, J. Fisher, J. Page, J. Coe, and A. E. Dinning (Hon. Sec.).

FIELD PEAS.—An extract dealing with the value of field peas as stock fatteners and soil fertilisers was read by the Hon. Secretary. Mr. R. A. Humphris had successfully grown this crop on this side of the Flinders Range, but last year the crop on the other side was a complete failure owing to the hot winds. He advised putting them on fallow. "Dark-eyed Susan" was the best variety, yielding up to 30bush. per acre.

Julia, May 17.

(Average annual rainfall, 18in. to 19in.)

PRESENT.—Messrs. T. Prior (chair), O. B. Pfitzner, A. Pfitzner, D. S. Heaslip, T. Brown, T. Neylon, W. Thiele, W. Hall, T. Carter, W. Polden, W. Copley, P. Copley, R. Neal, J. Dunstan (acting Hon. Sec.), and two visitors.

GRADING SEED WHEAT.—Mr. Prior, in a short paper on this subject, said grain intended for seed should be thoroughly ripe before being harvested. It should not be allowed to remain on damp ground. Grading was very necessary. The machine should be placed on a level surface, in order that the grain might work evenly over the sieves. All cracked and small grains should be removed, as well as foreign seeds such as charlock. Cleaned seed ran evenly through the drill, thereby contributing largely towards even crops.

POULTRY.—This subject was dealt with by Mr. Hombach. Fowls, he said, could not be kept to better advantage than on a farm, as there was ample space for them, and also a large amount of feed which would otherwise be treated as waste. However, they required proper attention, and should not be allowed to roost in trees or sheds. Clean, and well protected houses and yards were necessary. There were two systems of housing generally favored, viz., the "colony" system, and the "continuous house" system. In the former, small houses for the accommodation of a limited number of birds were placed in yards. Where timber was cheap this was probably the most practicable, as only a small number of hens needed to be kept in one place, consequently cleanliness of quarters was easily attainable. The "continuous house system," however, was widely favored. It consisted of a long house divided into compartments of about 6ft. by 10ft. The provision of a scratching shed was most essential, especially where the production of winter eggs was the objective. Continuing, the paper read:—"This shed should have plenty of light, protect the fowls against cold winds, and be large enough to hold most of the birds at one time. A good scratching shed will keep them warm and busy if the weather is rough. Boxes or cases may be placed in the scratching shed or by themselves in the yard, but should not be put in the roosting houses, as the eggs become soiled in the latter. Fowls, like any other living beings, need a variety, and rations that are well balanced. Of course, on a farm they generally get their own pickings of grass and grit; but if any of the fowls are housed they need lime, and grit, charcoal, and bonedust, as well as cracked glass crushed fine to assist digestion. White Leghorns, pure bred or of high grade, are without doubt the best for egg-laying purposes. The Indian Game excels for the table, as it carries more breast meat than any other fowl; but the Game is not as a rule a good layer. A great mistake is made in mixing the breeds, as mongrels and inferior birds will be the consequence. Whatever breed of fowl is kept, it should be fairly pure. High-bred birds bought from poultry fanciers frequently are not quite so hardy as is desired for the farm. To get a flock of good hardy and high-grade fowls is not as difficult as it might appear. Anyone desiring to gain such an end can do so by culling his flock of hens on hand and then using pure-bred male birds for several years in succession. Birds bred and reared for several generations in surroundings and under conditions under which they are kept for the intended purpose will do best. A good many persons have mistaken ideas about crossing two different breeds. While sometimes the result in the first generation is fairly uniform, the following generations are always mixed, showing not only features of the parent stock, but more generally a great variance in regard to size, color, shape, and egg-laying qualities. Most of our new breeds, as the Orpingtons, Rocks, &c., have been produced by crossing several different breeds and then the exercise of careful selection. Therefore in crossing such breeds again, or even if crossing with Leghorns, which are of a more fixed type, most of the features of the parent stock will be lost and mongrels will be the result.

Julia, June 14.

(Average annual rainfall, 18in. to 19in.)

PRESENT.—Messrs. T. Prior (chair), H. B. Traeger, D. Heaslip, T. Brown, R. H. Copley, F. Carter, C. Nash, R. Neal, W. Polden, W. Hall, B. J. Schmidt, A. Dunstan, W. Copley, R. W. Rowett, O. Pfitzner, A. Pfitzner, G. Greath, J. Dunstan (acting Hon. Sec.), and four visitors.

BLACKSMITH AND CARPENTER'S SHOP ON THE FARM.—Mr. H. B. Traeger dealt with this subject in a paper. It was advisable, he said, in order to keep expenses at a minimum and to prevent unnecessary delay in the various farming operations, for the farmer to have

a small blacksmith's and carpenter's outfit. Especially was this so when he was some distance from a smithy and stump-jump implements were being used. The paper continued—"The erection of a serviceable shed and the purchase of the things most urgently required would involve an expenditure of about £15. For the blast I prefer the bellows to the centrifugal blower, by reason of their cheapness. An anvil should weigh not less than 10wt. A fairly strong vice, tongs, hammers, chisels, drilling machine, and thread-cutting apparatus are indispensable in the workshop for a start. These, with the timber and iron for the shed would constitute the biggest part of the outlay. The carpenter's outfit consists of a bench (a very serviceable one can be made by any handy man from a plank of red gum or jarrah of the required size; the screw can be obtained from any hardware merchant), several kinds of saws, brace, and bits of all sizes up to 1in., square, draw knife, jack and smoothing planes, chisels of several sizes, &c. In addition to these it is advisable to put in a supply of timber for swings, such as 3 x 2, 4 x 2, 4 x 3, and 6 x 3 stringybark, and several lengths of flooring and shelving; also a quantity of bolts of all sizes, nuts and washers, and a variety of nails, screws, tacks, and rivets should always be kept on hand. Such a workshop will form a valuable asset on any farm, and help the farmer out of many a difficulty, besides reducing his expenditure considerably every year."

Leighton, May 22.

(Average annual rainfall, 16in. to 17in.)

PRESENT.—Messrs. McDonald (chair), J. J. Warnes, J. McDonald, M. Hogan, J. Hogan, W. Morgan, W. Bailey, E. Jettner, T. Goodridge, D. Williams, J. Earle, S. Williams, R. Fairchild, A. E. McWaters (Hon. Sec.), and three visitors.

CO-OPERATION AMONST FARMERS.—Mr. J. Hogan read a paper, as follows:—"From time to time short articles appear in newspapers regarding co-operation for farmers, but seemingly there is not the attention paid to this matter that it deserves. Farmers generally are placed in an unfortunate position, as they have no control over the prices demanded for their requirements, and not the slightest control over that which they sell. They pay the prices demanded, and accept those offered. Any farmers who have thought the matter out must see that they are laboring under a tremendous disadvantage in their buying and selling, as that which they require is kept at the highest possible price by those who profit by it, while the farmers make little or no effort to place their produce at an advantage. This state of affairs should not exist, especially as farmers have, by the application of co-operative principles, the solution of the whole difficulty at any time they may take the trouble to organize and take a little more interest in and have a little more say as to the manner in which the several businesses that vitally affect them are conducted. Taking the motor power used by agents for machinery as a criterion. Here there must be large profits that could be retained by the farmer. Everyone is aware that it is immaterial whether the order for implements is placed in the city or the country, the local agent secures 5 per cent. or 10 per cent. commission on a sale with which he may not have had anything to do. Why they submit to this passes all understanding, and the only excuse that can be offered is that time and custom sanction such a state of affairs. While farmers have made great strides in production, they have not paid any attention to the selling or buying part of their business. By the kindness of the manager of the Hawkes Bay Farmers' Co-Operative Association, some information is available, and I cannot do better than give the manager's outline of its history. It was started in 1891, and financed by allotting £5 shares, of which £3 was called up. This, with an overdraft on security of property immediately secured by the company, and a lien to a bank for uncalled capital, provided initiatory funds. The association is established in the interests of farmers, but other persons were not excluded, though care was taken that outsiders did not get a paramount interest in the concern; but as long as farmers have the controlling vote, outside capital may be admitted with advantage. The company does all its importing, and has but one price, though goods in bulk can and are sold at a lesser price than small lots. All farmers' goods and machinery are supplied. The society buys from the farmer, or sells on his account, all his field crop, wool, skins, and live stock. Advances are made to farmers on security, and commissions undertaken for them. Last year's balance-sheet showed a dividend of 8 per cent. on paid-up capital, a bonus of 25 per cent. on commissions contributed by shareholders (land excepted), 2 per cent. on goods purchased by shareholders, 5 per cent. on salaries earned, and £1,000 to reserve fund, and balance carried forward. Properties held in freehold, and leasehold land and business premises, plant, merchandise on hand, advances against freehold and leasehold, stock, wool, and amounts due and balance in bank amount to £78,000. The manager

of the Tokomaru Farmers' Company, in the fifth annual balance-sheet, shows a net profit of £2,300 on the year's operations, from which was paid a dividend of $7\frac{1}{2}$ per cent on paid-up capital, $3\frac{1}{2}$ per cent. on goods purchased by shareholders, a return of 5 per cent. of commissions contributed by shareholders, a rebate of 1s. per bale on wool sold through the company, a bonus of 5 per cent. to the staff, and balance carried forward, while the assets acquired in five years are valued at £14,600. These facts and figures are indisputable, and speak strongly in favor of co-operation, as that which was done in New Zealand in such a short space of time should be possible in our own State. If some scheme were worked up whereby a farmers' union could do the bulk business and distribute goods to individual co-operative companies in the country, much good would accrue to the community generally, as farmers would take more interest and put more business in the way of companies formed in their own districts. With a co-operative company importing, buying, and forwarding to centres in the country, which centres it would be to the farmers' best interests to conserve, we would at least buy from the world's cheapest markets, without maintaining innumerable middle-men, who constitute a superfluity that under co-operation we could do without."

Mount Bryan East, June 14.

(Average annual rainfall, 16in.)

PRESENT.—Messrs. J. Thomas (chair), Hughes, Tralaggan, Doyle, B. and W. Dunstan R. Thomas (Hon. Sec.), and three visitors.

SEASONABLE TOPICS.—It was reported that a number of foxes had been poisoned in this district of late, but little loss had been experienced among lambs. Lambing was in full swing, but grass was becoming scarce on account of the absence of rain. The Chairman had arranged for his 4 to 6 year old ewes to lamb first this year, as they generally took more care of their progeny, and yielded more milk. Also frequently they could be sold as fats in the spring. Young ewes were likely to allow their lambs to perish if the feed were short and dry. Mr. Hosking (a visitor), dealing with the preparation of wool for market, emphasized the necessity for careful attention to detail in this regard. Branding should be neatly done, and should convey an accurate idea of the contents of the bale, which should not be pressed to hold more than 300lbs. of fleece wool.

North Booborowie, May 23.

(Average annual rainfall, 16·35in.)

PRESENT.—Messrs. Ashby (chair), Schaefer, Halls, Birks, Smart, Clark, Hannaford, W. and H. S. Tall, McColive, Sullivan, Dunstan, W. C. and F. C. Catt, K. and F. L. Phillips, H. A. Storr, Morgan, Warner, Simpson (Hon. Sec.), and five visitors.

SEEDING OPERATIONS.—The following paper was read by Mr. W. C. Catt:—"The preparations for seeding commence with fallowing, or even before that if the land is covered with stones, straw, &c., all of which should be picked off or burnt. Stones interfere with the ploughing, and are a source of wear and tear on implements and machinery, and they make the draught of the machines heavier. Straw is an hindrance to the plough and drill, but if it can be turned under it is a great advantage to the hard red soil in assisting in the retention of moisture and in forming humus. On the cultivation of the fallow a good deal of the success of the crop depends. If done well and at the right time the ground should be in a good tilth when worked up by the cultivator or skim-plough at seeding time, and there should be very little fear of a dirty crop on account of seeding before rain. In late districts, however, it is better to wait a few days after sufficient rain has fallen to germinate the seeds of weeds that may be on the ground, as all weeds seem to be large consumers of manure and moisture that should be maintaining the wheat plant. After the weeds have germinated the ground should be thoroughly broken to a depth of about 3in. to form a good seed bed. The seed should be cleaned of all rubbish and cracked grains, and anything that may tend to obstruct the working of the drill and so cause irregular sowing. It should also be pickled and allowed to become fairly dry before drilling. So long as the seed is covered by its own depth of soil it will be found to grow and yield well, but it is rather a difficult matter to cover the grain so lightly, and it is easier for birds to get at it. Too deep sowing may cause a poor crop, as the extra effort on the part of the seedling to reach the surface has a weakening effect, from which it does not recover unless it is in very rich soil. The farmer should not sow small

shrivelled seed. This results in a weak plant from the start. Of good sound seed a bushel is sufficient for a grain crop, but for hay not less than $1\frac{1}{2}$ bush. per acre should be sown. The amount of manure depends on the quality of the soil and on the amount of working it has had. The dressing should be liberal, as the extra amount is returned in a heavier crop. The ground should be gone over after the drill with light harrows to bury any seed that may be exposed. Cross-drilling is preferable." Members generally agreed with the opinions expressed by the writer of the paper. Mr. Birks would sow $1\frac{1}{2}$ bush. of graded seed to the acre. Members favored a 1 per cent. solution of bluestone for pickling, the floor method being preferred. Instances of malting of seed sown early in this season were reported, and also cases where resowing would be necessary.

Port Broughton, June 13.

(Average annual rainfall, 14·44in.)

PRESENT.—Messrs. W. Whittaker (chair), T. Pattingale, D. Allchurch, A. Hill, B. Donnelly, P. Whittaker, and J. H. Fletcher (Hon. Sec.).

CARE OF HORSES.—In a paper under this heading Mr. D. Allchurch said a young horse should be put in a steady team, and not worked for more than two or three hours for the first few days. Sore shoulders were, in the majority of cases, attributable to fast driving; the beast became overheated and its shoulders scalded. Horses should be stable fed for two or three days before starting work, and should not be expected to do too much at first. Four feeds per day at regular hours were necessary, the quantity and quality being carefully considered. Corn should not be used too freely, and the use of nosebags was deprecated. When the horses were given their dinner in the paddock it was better for the farmer to take a few feeders out with him. Clean water was essential, and if the trough was placed in the stable yard it would frequently be found that the animals dropped chaff into the water. A small paddock adjacent to the stables was the best place in which to place the trough. The Hon. Secretary agreed with the ideas expressed by Mr. Allchurch. The awkwardness of the gait of some horses was responsible for their shoulders becoming sore. Mr. T. Pattingale had a trough in his stable yard, but the horses invariably watered at one just outside. Mr. Hill advised the removal of loose and decayed teeth, but members disagreed, as fodder, &c., accumulated in the cavities remaining. Mr. Allchurch further advised turning collars lining upwards to dry at the dinner time during wet weather.

Port Germein, May 24.

(Average annual rainfall, 12·84in.)

PRESENT.—Messrs. Carmichael (chair), Hillam, Blesing, Deer, Holman, Stone, McDougall, Teasdale, Head, Stewart, Crittendon, and Hackett (Acting Hon. Sec.).

IMPOVERISHMENT OF SOIL BY HAY OR GRAIN.—The following paper was read by Mr. Blesing:—"Agricultural experts tell us that a crop cut for hay will impoverish the soil sooner than a crop reaped for grain. Very few of the old farmers will agree with this; and my own experience is all in the opposite direction. In the early days of farming, before fallowing was practised as now, and when most of the hay that was cut was around the outside of the paddocks and strips through the wheat for the stripper, one could always notice a better crop the following year where the hay had been cut. One of my friends on the Adelaide plains, who cropped about 400 acres annually, and cut the greater part for hay for the Adelaide market, maintained that three crops of hay would not take more out of the ground than two crops reaped for grain. When I was farming in the Hamilton district I had a two-acre patch which was cropped every year and dressed with stable manure every second year. One year I had a very heavy crop and left a portion of it for grain. The following year there was not more than half the growth on the land where the crop had been reaped for grain. It is 20 years since I came to Bangor, and I have a five-acre plot of ground close to the house, off which I have taken 17 crops. The first two years I reaped it for grain; since then it has been cut every year for hay, except one year in fallow, and twice fed off with cows. It never produced less than $1\frac{1}{2}$ tons, and in several years yielded over 3 tons per acre. Last year the crop was heavier than on the fallow. Of course, during the 20 years I applied sheep and stable manure twice, and during the last six years super. Two years ago my sons had a very

high and heavy crop on a 20-acre piece, part of which went flat to the ground during a storm in hay time. It had to be cut for hay, and yielded 4 tons to the acre. Last year they cropped the same piece again, intending it for feed, as it was clean and had only carried two crops. It was sown the last week in June, the ground only being worked with the cultivator and drilled in with 80lbs. of super. Although sown late it came on well, and being cleaner than some of the fallow it was left for grain. The piece previously cut for hay yielded over 20bush.; the other stubble piece 14bush. It must be stated, however, that there were two different wheats sown. On the hay ground an early wheat (Bunyip), and on the other a late wheat (Dart's Imperial). The early wheat got very little benefit from the November rains, being past bloom, whereas the late wheat received the full benefit, not being out in ear, and grew nearly a foot higher than the early wheat. *Farm Machinery.*—In the Bureau Congress in September last the Minister of Agriculture (Hon. T. Pascoe) laid particular emphasis upon the fact (and which he proved by official returns for the last 20 years) that on account of the present improved methods of farming we shall never have as low an average yield as we have had in the past during years of drought, and which the figures for the last 10 years compared with the figures of the previous 10 years fully bore out. One phase of the subject seems to have been lost sight of. Among the old established farms thousands of pounds worth of machinery and implements—some nearly as good as new—are all thrown on the scrap heap and replaced with more modern implements, many of which only save a little elbow grease." The writer then referred to the expenditure on modern vehicles, motors, and entertainments, and said that the cost of actual necessities of life was lower to-day than 40 years ago. Unless greater care in the control of expenditure was exercised, or larger yields reaped, balances would soon be on the wrong side of the ledger. Mr. Deer agreed that wheat took more out of the land than hay. Farmers were forced to purchase modern labor-saving machinery on account of the scarcity of labor. The motor car was not a luxury; it effected a saving of time, which was valuable. Mr. Crittenden had found a motor car cheaper than a buggy and pair. Mr. McDougall was of the opinion that lighter crops were secured from land under hay stubble than was the case on wheat stubble.

Port Pirie, June 7.

(Average annual rainfall, 13·21in.)

PRESENT.—Messrs. C. Birks (chair), T. Johns, D. L. McEwin, C. B. Welch, A. Bond, J. Greig, A. M. Lawrie (Hon. Sec.).

CARE AND MANAGEMENT OF FARM STOCK.—In a paper on this subject, Mr. C. B. Welch said horses should be treated well from the time they were foals. At six months of age they should be weaned and turned into paddocks, if a supply of green feed was available, but in the absence of this they should be shut up and supplied with short hay, or bran and chaff. At 2½ years they should be ready for breaking; but they should be worked with caution at first, or trouble would be experienced with sore shoulders. When the team had been spelling for some time it should not be put immediately to heavy work, as there was danger also of trouble in this direction. The shoulders of the animals should be well groomed. They should be kept in a good stable at night during seed time, and fed on good short hay. Sheep were very useful for cleaning the fallows, but care should be taken not to overstock. At this time of the year the wethers should be cleaned around the pizzle, and it was a good time to put the whole flock through the shearing shed, carefully breeching them. This should prevent the ewes becoming daggy. Attention should be paid to the eyes of the animals, as there was always the probability of some of them becoming wool blind. The lambs should be tailed when about a month old, a good sharp knife being used, and a day when there was little likelihood of frosts selected to do the work. Shearing should be done in September in this district. The shed should be carefully cleaned of any straw or chaff. A grating should be provided, and after shearing the animals should not be kept in a cold yard. The rams should be put in about the end of November, which would result in lambing commencing toward the end of April. Early lambs were most profitable here. The animals should always have access to water in clean troughs. The average farmer was advised to keep only sufficient cows to provide milk for his own requirements, as it did not pay to rear cattle on land where sheep could be kept. Mr. Johns had fed cattle suffering from dry bible on the following:—Water, chaffed hay, and 4galls. of molasses, to the amount of about half a hogshead, thoroughly mixed. The stock ate this readily, and the treatment was successful.

Redhill, June 10.

(Average annual rainfall, 16·79in.)

PRESENT.—Messrs. J. A. McAvaney (chair), Stone, Cox, J. J. and W. Hayes, Potts, E. Steele, Dick, Holmes, Pengilly, W. J. Button, Kelly, Campbell, F., P. H., and F. A. Wheaton (Hon. Sec.)

FALLOWING.—Mr. F. A. Wheaton read the following paper :—" Fallowing is a practice without which we in this district cannot till land successfully, and the necessity arises for each farmer to conduct his own experiments in this direction, as a certain practice on one farm may not suit a neighboring holding. The first item to be considered is that of the best time to fallow. This depends somewhat upon conditions prevailing on the farm, but I think the best time is during the months of June and July. Autumn ploughing has lately come into practice, and is becoming popular. This has its advantages. Firstly, it is a slack time of the year both with horses and men on the farm, and, secondly, it lessens the time required for fallowing in the winter months, when the work is so much heavier for the horses. As against this, however, autumn ploughing often necessitates burning off of stubble which might be needed for sheep feed. Land ploughed at this time often turns up cloddy: that is if ploughed to a depth greater than 3in., and this is not desirable; therefore I recommend ploughing in June and July, when the land is in good condition for such treatment. Some will no doubt say that one cannot get enough work done in these months, but an eight-horse team should be able to work 180 to 200 acres of land. In June and July there are 61 days. Allowing for wet days and a few days at the beginning of June, when finishing seeding, there should be about 53 days in which to fallow, or 30 full working days (five Sundays). If a team is managed well it will do six acres per day, unless the field is a good distance from the homestead. Thirty days work, covering six acres per day, is 180 acres, and then a few days of August may be necessary to complete fallowing operations. The depth of ploughing will vary with different soils, districts, and climate. The usual practice in this district is about 3in. or 4in. However, I think the depth could be increased to 5in. with gratifying results, for the following reasons :—(1) More moisture is conserved in the fallow; (2) the subsoil is given a better aeration, and the rains soak into the subsoil more satisfactorily; (3) there is more soil in which to store nutritious constituents; (4) if the soil contains more food it is better able to withstand disease, and, in this connection, it is my candid opinion that if our soils had been worked more deeply we should not have been troubled with takeall to such a large extent as we have been in the past. If a uniform ploughing is not suitable, I would suggest as an alternative that the land should have a 6in. furrow every three croppings, and the usual depth of 4in. at other times. The best kind of plough is a matter of judgment, and no definite statement can be made; but whatever make it is the grassy top of the soil should be turned under and the lower layers exposed. The best ratio between depth and width of cut is three to two, i.e., if ploughing 4in. deep the width should be 6in., 6in. deep, 9in. wide, and so on. The best ploughing results if this ratio is adhered to. The cultivation of fallow lands will vary according to the soil. I am not in favor of the harrows being the first implements used, as the effect is to close up the soil, as it were, which is not required till later on. The cultivator should follow the plough at a time most convenient to the farmer. It should work fairly deep, but not quite as deep as the plough. The harrows should follow on to break down the roughness somewhat. The operations up to this point should be finished about the middle to the end of September. In October the land should again be cultivated just deep enough to kill the weeds. The harrows should again follow, to leave the soil in a very fair condition of tilth. These last two operations will have the effect of consolidating the subsoil to a certain extent, although the first cultivating plays a very important part in that direction. If a rain of 40 points or more should fall during the summer months the harrows should be run over the fallows as soon as possible to conserve as much moisture as nature will allow. The sheep should also be used when necessary in cleaning the fallows, as not only do they eat any grass, but help to consolidate the soil, and also add organic manure in the way of droppings." Mr. R. Dick also contributed a paper on this subject. It was necessary for the farmer in this district, he said, to early fallow all land which he intended to crop. If the ploughing was done later than August the weeds were not given a chance to grow, and dirty crops were the result. Land that had laid out for a number of years should not be ploughed deep, as it would turn up rough. In no case should two successive ploughings be to the same depth. Small furrows were best, 8in. being the maximum. Land that was likely to run together should not be ploughed when too wet; the ploughing in of straw would tend to prevent trouble in this regard. Ploughing too dry resulted in the crops being affected with takeall. When

the land was dirty the cultivator could be used in place of the plough after harvest. A quicker germination of weed seeds should result, and these could be ploughed under. After ploughing, the land should be harrowed down to a fine tilth, and cultivated shallow as soon as weeds grew. Sheep should be put on the fallow as much as possible, and the harrows should be used after rain to assist in the conservation of moisture. Mr. Stone preferred to use disc implements, as there was then no difficulty with the lumps. He attached a set of harrows to the plough. Mr. Kelly ploughed land that had been laying out deeper than stubble land. If the soil turned up lumpy a better fallow was obtained. He always used the harrows after the plough. Mr. Steele preferred to harrow twice, once in each direction, after the plough. Mr. Potts recommended ploughing clay patches deeply. Mr. F. Wheaton considered that shallow autumn ploughing, followed by a deep winter ploughing of 6in. or 7in., with the mouldboards removed from the plough, was a practice worthy of consideration. Some years ago he had ploughed a small strip of land through his paddock to a depth of about 10in. The result at the first cropping was unnoticeable (it was a fairly wet year), but in 1911 (a fairly dry year) from 5bush. to 6bush. more per acre were harvested on that strip of land. He favored deep ploughing, but it was too costly. Most members considered that ploughing from 3in. to 4in. deep, with the free use of harrows after the plough, was most satisfactory. All agreed on the advantages to be derived from running sheep on the fallow.

Whyte-Yarcowie. April 28.

(Average annual rainfall, 13.91in.)

PRESENT.—Messrs. G. F. Jenkins (chair), G. Wittwer, G. W. W., and J. R. Mudge, Robinson, McLeod, McGregor, F. Mitchell, J. Walsh, F. Hunt, Faulkner, Pratt, Lock, E. J. and F. Pearce (Hon. Sec.).

FARM HORSES.—This subject was dealt with in a paper by Mr. J. Walsh. The best horse for the farmer, he said, was the well-bred, heavy draught. Four points in connection with the working of these animals which should receive attention were—(a) good feeding, (b) the use of well-fitting harness, (c) careful driving, and (d) reasonable work. During harvesting operations, if two teams were available for each machine, good long hay only could be fed; but if one team only was available for use in the machine, and the work was heavy, they should receive chaffed wheat and oats (the oats being cut when nearly ripe), and oats at dinner time. It was a mistake to drive the harvester too fast. During seeding the horses could receive chaffed hay, oats being mixed with this at the dinner and evening meals. This ration had also been adopted at fallowing time with satisfactory results. The best system consisted of chaff with or without bran in the morning, chaff and oats for dinner, and chaff and molasses at night; the chaff consisting of wheat and oats in the proportions of two to one. Rock salt should be provided in the mangers. Well-fitting collars should always be provided, and when these were being reined the saddle should be allowed to see them on the horses. A well-fitting collar was of no use unless the hames were likewise. All the harness should be well oiled and kept in good repair. After a spell the horses should not be put direct to hard work. It was better to take a couple of times off the cultivator than to work an eight-horse implement with seven horses. The animals should be groomed every morning, special attention being paid to the shoulders. Teams of eight or more should be worked with leaders if the driver was a careful and experienced man. Horses were frequently spoiled on account of not being kept up to their work when young. When breaking young draughts the best plan was to mouth and lunge them, and then after a week of this put them in the shafts of a wagon alongside a quiet animal. They could then be taken from the wagon, put in the body of the team or in the plough, and worked for half days. An open bridle should be used for four or five days. Where blinkers were used, and these fell off, there was more likelihood of the animal bolting. Mr. McGregor when mousing horses would use a light piece of rope, one end of which he would attach to the bit, and the other to the animal's tail, pulling it tight enough to exert a pressure on the mouth. After this had been on one side for about 10 minutes it should be placed on the other. The ration mentioned in the paper was too rich for draught horses. He would feed long hay only at night. Mr. Mitchell thought they would do well on rich food. Mr. Robinson thought the practice of mixing oats and hay in the stack encouraged mice, and the proportion of the ration could not be so well regulated as when the oats were reaped and added to the hay chaff. A weekly feed of green-cut lucerne was an excellent addition.

THICK v. THIN SOWING.—Mr. W. Mudge read a paper on this subject in which he said that for a wet district with a sure rainfall and rich, well-worked land a thick sowing of, say, 70lbs. to the acre was advisable. Much would depend on the variety of wheat, as some did not stool well, and others germinated badly. If, however, the land was dirty, or was cropped very frequently, between 50lbs. and 60lbs. would be best. With lighter rainfalls thinner sowings were required. The dressings of super. should vary in like manner. In wet seasons land which had received heavy dressings gave good results, but lightly-manured crops stood the dry weather much better. Seventy pounds to the acre was sufficient anywhere. It was seldom that more than 20bush. per acre were reaped in his district, and 50lbs. of manure was plenty. New land, or land which was grazed and only cropped once every four or five years, should not require more than half the quantity applied to land constantly under crop. Mr. McGregor did not think it advisable to sow thinly when the land was dirty. One landholder in the district sowed as much wheat as the drill would distribute on a piece of dirty ground, and as a result reaped 30bush. to the acre; the crop was one of the cleanest in the district. Other members agreed that thick sowing was better. Mr. Lock did not think heavy dressings of super. were responsible for the crops burning off. Phosphoric acid was a plant food and not a stimulant. The plant required a certain quantity, and if more than this was applied the residue remained to the benefit of succeeding growths. Mr. Jenkins last year used 80lbs. to the acre, and the extra cost of the manure was amply repaid in the crop.

Whyte-Yarcowie, May 24.

(Average annual rainfall, 13·9in.)

PRESENT.—Messrs. G. F. Jenkins (chair), Wittwer, McLeod, Van Senden, McGregor, J. Walsh, J. E. Hunt, A. and F. Mitchell, Lock, J. R. Mudge, W. Mudge, Pratt, and E. J. Pearce (acting Hon. Sec.)

SKIM CULTIVATOR v. PLOUGH.—The following paper was read by Mr. F. Mitchell:—“For years I followed my land with two three-furrow ploughs, requiring two men and 12 horses to work them. A few years ago I bought a skim cultivator, and found that one man with eight horses could do more work, and do it equally as well as I had done previously with the two ploughs and extra strength. I have found the cultivator a more successful implement than the plough, as the latter has a tendency to turn up the earth in large lumps, which often defy the harrows to break them, thus harboring seeds in the clods and sides of the furrows not packed closely enough to cause germination. On the other hand the cultivator, with 6in. shares, will cut the ground and leave it close and even, thus encouraging the weed seeds to germinate. I also find that the harrows do much better work after the cultivator. Considering that we have, as a rule, to cultivate our land three times before seeding, it is unnecessary to drag a heavy implement when a lighter one will do equally as well. The land appears to hold the moisture better after the cultivator, as the plough often leaves the work too open. I am convinced that the skim cultivator is the most successful implement for autumn fallowing in this district, and particularly recommend it where the land is very dirty and requires a good deal of cultivation.” Members generally agreed with the ideas of the writer of the paper, except in that some thought it unadvisable to continuously work the land in this district as suggested, occasional working to a greater depth being necessary. In reply, Mr. Mitchell said that for dirty land thorough cultivation and a fine seed bed were essential. These could best be obtained by the use of the skim cultivator, with which he could, if desirable, work to a depth of 4in.

CO-OPERATIVE SHEEP DIP.—In discussing this subject members, whilst agreed as to the advantage of dipping sheep, were not sanguine that a co-operative dip could be satisfactorily worked in the district. Messrs. Hunt and McGregor thought a rough and ready dip, which would suit the purpose, could be fixed up on any farm at a nominal cost. The Chairman was of the opinion that tick and lice would not thrive on sheep in the dry, warm climate of this district.

Whyte-Yarcowie, June 21.

(Average annual rainfall, 13·9in.)

PRESENT.—Messrs. G. F. Jenkins (chair), G. R. and J. R. Mudge, J. E. and F. Hunt, jun., J. McLeod, G. D. and W. Mudge, F. H. Lock, F. Mitchell, and E. J. Pearce (acting Hon. Sec.).

BULK HANDLING OF GRAIN.—The following paper was read by Mr. F. H. Lock :—
 "Our subject is really the up-to-date *versus* the primitive system of handling wheat, and as in other things the primitive means have had to give place, so in connection with wheat—which is South Australia's chief product—changes will have to come eventually, for the present system is proving very expensive and burdensome, and likely to become more so. That Australia is beginning to realise the need of a change is evident by what is being done. New South Wales has sent to America to obtain the services of an independent expert to inspect and report on the best means for improvement. Victoria through a Royal Commission is urging the necessity for an improved system, and suggests the co-operation of the States in the matter, whilst in this State there is a strong undercurrent of dissatisfaction with the present system. That something will have to be done to save the farmers from the ever-increasing expense of the bag is certain, but what that shall be must be carefully investigated before it is initiated, and the action of the New South Wales Government in obtaining the advice of an independent person appeals to me a highly desirable proceeding. The case against the cornsack is mainly one of £ s. d., for it is quite a convenient method of handling, although the present marketing arrangement is far from the best from the farmer's standpoint. On the recent crop of 21,496,216 bushels (Government returns) 7,000,000 bags were used, which at an average cost of 6½d. per bag means an expense to the farmers of £189,583, for which they received, weighing bags as wheat, about 1½d. per bag, or £43,750, showing a loss of £145,833. To localize it, this district used about 70,000 bags, at a cost of £1,895, which returned £437, showing a loss of £1,458. A farmer who used 2,000 bags would be the loser of £41 10s.; not a great amount, certainly, but if that same man mislaid a sovereign he would spend considerable time in trying to find it; and that is just what the farmers of this State will have to do, find that 5d. they lose on every bag of wheat they sell. It may be said that bags last harvest were above the average price, but there is absolutely no reason to hope they will be lower this, and in all probability they will be higher. They are now quoted at 7s., and a few weeks ago they were 5s. 9d. in Calcutta, at which price they will show small profit at 7s. landed here after expenses are paid. It is not necessary for me to say more on this score, as we are all quite aware of the expense of the bag; but there is another phase of the present system which certainly must be attended to before the farmers can get a fair deal, and that is the standard of f.a.q. *F.A.Q. Standard.*—This question is far more important than appears at first. Expert evidence given before the Wheat Commission stated that the higher the standard fixed, the higher the price, and if the standard was fixed ½lb. below the actual average, the merchants could put money into their own pockets which should go into the pockets of the farmers. If in a year when the actual average was 63lbs. the wheat was sold on a basis of 60lbs., it would result in a loss to the farmer of £187,500. The standard is fixed by the merchants through the Corn Trade Section of the Chamber of Commerce, and no doubt it is an honest transaction, although the merchants would directly benefit if a mistake were made and the standard fixed ½lb. or so below the actual average. I should like to know that this mistake is not being made, for if the average sample taken from the lot when bulked turns the scale at 63lbs. the standard is fixed at 62½lbs., the ½lb. being allowed for subsequent absorption of moisture. This deduction for absorption of moisture appeals to me as a very profitable logic for the merchants, for doubtless we have all had experience of the increase in the weight of bags which have been stored for some time, even up to as much as 6lbs. to 8lbs. per bag, and I was informed yesterday that wheat recently removed from a local stack on reweighing was going from 20lbs. to 25lbs. more than the marks on the bags indicated it was when bought. If this is so, it certainly points to more than increase of weight by absorption of moisture, considering the exceptional dryness of the season. Nevertheless it is an indisputable fact that wheat does gain in weight, and although this may affect the weight per measure slightly, the increase will more than make up for it. In New South Wales no deduction is made whatever. Now, as to marketing under the standard. What do we as farmers find? That if we tender wheat that is below, we are docked for it, but no matter how much it is above it is almost if not quite impossible to get an advance for it. Of course, locally for several years the agents have accepted practically all the wheat without question as to sample. This may have been due to keen competition, but the fact is that during this time this district has grown a remarkably good sample, averaging well above the standard, which fact, I consider, accounts for both the keen competition and the indifference of the merchants through their agents in testing the sample. That the better the quality the more valuable is the wheat for flour was demonstrated in a test carried out by Professor Angus, as follows :—A wheat weighing 68lbs. per bushel measure produced 77·44 per cent. of flour, another 67½lbs., 75·5 per cent., while another going 63lbs. yielded only 68·8 per cent. of flour. Under the present system

it seems hardly practicable to have other than the f.a.q. standard, although the two-standard system might be tried. Certainly in this we need not expect help from the merchants, because buying under the present f.a.q. system suits them, as they usually dock for anything under, except what is above, mix the two for export, and sell as f.a.q., thus increasing their profits. Whilst the farmers are content to let them do this, no one can blame them. Many more arguments could be brought to bear against the present system generally, but time necessarily limits me to a few. *The Elevator System.*—I will now proceed to deal briefly with the elevator system, which I am prepared to say without fear of contradiction is bound to come eventually. In view of the increasing cost of bags, and other defects of the present system, together with the increasing production, when that time shall be is a serious consideration for all interested in wheat production. That the introduction of the system of bulk handling in this State is fraught with many difficulties is without question; but they are not insurmountable. Other countries where this system is in operation have overcome similar difficulties. The cost of the scheme in its entirety—as we see it in America and elsewhere—would be considerable, but no one would dream of launching the whole scheme in one act. It would be far more reasonable to spread the cost over a number of years; then it would not be burdensome. Certainly in considering the cost thereof we must place against it the annual expenditure on bags (for the other charges will be about equal for both bags and bulk), and the fact that bags are an ever increasing outlay, whilst the elevator would be a permanent asset once erected. If a sum equal to that lost by the farmers annually on bags, viz., £145,000, were put into installing the bulk system each year, in 10 years this would mean about £1,500,000, which would give us at least a fairly up-to-date elevator system in this State. In America the elevators are owned by the railways and worked under Government inspection, the railways there being privately owned. Here, where our railways are the property of the State, the elevators should be a State enterprise, and if it pays the railway companies of America to put the money into it—as it unquestionably does—it should certainly pay as a State concern here. One of the difficulties as regards this State is the number of ports where wheat is loaded direct for export; but more than two-thirds of the wheat exported goes from three, viz., Ports Adelaide, Wallaroo, and Pirie, so the trouble is not so great as appeared at first sight. Then, again, the quantity of wheat produced is said not to justify the cost. Even if such is the case, production is decidedly on the increase and we can confidently look forward within a few years to having on an average 20 to 30 million bushels for export. Another is that the shipping companies do not at present cater for bulk transport; but no doubt if the change were made they would quickly accommodate themselves to it, for the shipping companies generally favor the bulk handling, as it is quicker to load and unload, and less space is taken up by the cargo. Then, again, it is said that insurance on bulk cargoes would be hard to obtain, as the underwriters' association are opposed to the system. On a trial shipment from New South Wales some few years back no difficulty in this way was experienced as far as I can ascertain, and doubtless if the bulk system were adopted the underwriters' association would conform to it, as the fact that fully two-thirds of the wheat imported into the United Kingdom is in bulk goes to prove not only the general acceptance of the system, but that the risk of loss is no greater. Doubtless there are other difficulties, but they are more apparent than real. One thing is certain, I consider, and that is the opposition of the merchants and millers. When we consider that at present the traders fix the standard, fix the general level of prices in the country, determine the practice in relation to the purchase of wheat below and above the standard, determine the bag system (excepting the size), and also the conditions for storage, can we wonder if they see strong reasons for retaining the present system? Under the bulk system practically all these powers would be taken from them, and they would be placed on the same level as the farmers, and have to conform to the system, whereas at present the farmers have to conform to a system created and worked by them. The difference is great, and not likely to appeal to them; but the farmers have the numbers, and if they will, they can make the way. Sometimes it appears as if the average farmer has a natural prejudice against any change until it is fully demonstrated that it will pay, and even some seem to think that the merchants and middlemen generally are running their different businesses solely for the benefit of the farmers. Now for some of the advantages of the bulk system. The first of these is the saving in cost of bags, which would perhaps be hardly noticeable for a year or two, but which would eventually accomplish much in this way. It makes grading possible, and instead of as at present only one standard, several grades could be recognised, both at home and for export, as is done in other countries, encouraging the farmer to grow better wheat and clean it better, and place each district on its right level. At present the districts which grow the better quality have their profits reduced to make up for the

loss favored. This also applies to the individual farmer. The cleaning of the wheat, which would be done in the elevators, would be a decided advantage, as the export of a purer sample would tend to create a better demand, and hence a better price; for at present it is estimated that South Australia exports 15,000 tons of rubbish in the wheat annually, which cannot be welcomed by the millers, although they are able to save themselves by grinding same and selling as pollard and bran. Nevertheless, a pure sample of wheat up to a certain grade must be more acceptable and worth more. There is also the reduction in manual labor, minimising the cost of handling. The difference would be much on the same scale as the difference between filling and handling a hundred-gallon tank with water, and the filling, corking, and handling of 100 gallon bottles. Then comes the question of weighing. Under the bag system each bag is weighed, and each time the buyer gets the advantage of the draft, whilst wheat in bulk is automatically weighed in 2-ton lots. The weighing question appears to be one of the chief objections of the English merchant against bulk, for although the draft is very small, when there are thousands of bags in question it mounts up considerably. Another consideration is the comparatively little risk from vermin and weevil, both in store and boat; also the damage by weather. Further, it would overcome very much of the present risk from reaping dump or under-ripe wheat with the harvesters, in that on being received at the elevators it would all be cleaned again. *Prices and Costs.*—Now as to the price realised and cost of transport of the two systems. The price would be much about the same, for on the one hand the value of the bag is taken into consideration, but on the other is the increased value of a clean sample. Transport charges are in favor of bulk handling. It has been questioned whether wheat in bulk can be exported owing to the great distance to the oversea markets, but some years back a trial shipment was sent from New South Wales, and went by the way of the Cape of Good Hope, was received in England in splendid condition, and realised practically the same as bagged wheat. Bulk handling is not unknown to Australia, for in New South Wales several milling firms have erected elevators for their own use, and as an instance of the minimising of labor under this system, in one of these elevators 13,680 bags were received by 12 men in one day. Receiving includes weighing and cleaning. Now to consider briefly the outline of a scheme for initiating the system in this State: In the first place attention must be given to the three ports (Adelaide, Wallaroo, and Pirie) by the erection there of what are known as terminal elevators, which would, for some time to come, be ample, as wheat could still be bagged, carried by rail as now, and when emptied into the elevators, returned to the farmers, as is done in some parts of America still. The bags, well cared for, would in this way last for several seasons. As this arrangement might lead to confusion, and the mixing up of different farmers' bags, a better system would be for the bags to be loaned to the farmers from the elevators from year to year as required, as is also done in America to a certain extent, and in England by the elevator companies to millers in the country to carry the grain which is received in bulk to their various mills, no facilities for carrying grain in bulk being provided by the English railway companies. As time went on the system could be further extended by providing elevators at the lesser ports, and by the Railways Department gradually and systematically replacing the present trucks by one suitable for the carriage of grain in bulk, which would at the same time be as useful for the carriage of other goods. Receiving elevators could then be erected at the country centres, preference being given to the places from which the greater quantities of grain were raised. This could be gradually extended until we would have the complete system, which would be permanent and far more economical than the present. The farmers would accommodate themselves to the new order by providing box wagons, facilities at home for the storage of grain in bulk, &c., thus practically doing away with bags altogether and effecting a great saving in cost."

Yongala Vale, June 14.

(Average annual rainfall, 13in. to 14in.)

PRESENT.—Messesrs. T. Keatley (chair), F. Miller, C. and E. Fowler, J. Barber, T. Battorsby, J. Lloyd, G. Keatley, W. Scott, F. Laubsch, G. H. Jansen (Hon. Sec.), and one visitor.

CORN SACKS.—Mr. Miller read a paper in which he said that the farmer had little chance of securing corn sacks at cheaper rates for some time to come, as during the past few years the price of jute had risen from about £12 to £14 to £29 per ton. As the sack weighed 2½lbs. at the time of manufacture, it cost 7d. at the present time for raw material. Rates of wages in Calcutta had increased greatly during the past few years, and this had added to the cost of manufacture. The best policy farmers could adopt was to order

between 50 per cent. and 75 per cent. of their estimated requirements at the earliest possible time, and thus give the merchants an opportunity of gauging the number that would be required during the year. The suggestion that farmers should combine and purchase direct, was to his mind impracticable. Members agreed that it was advisable for farmers to purchase their sacks early. They opposed the purchase of second-hand bags, on the ground that this necessitated the closing of factories in Calcutta, and the price consequently increased. Mr. J. Lloyd had put sound wheat in second-hand bags, but it became badly affected with weevil, which spread to wheat in new bags alongside.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

Blyth June 20.

(Average annual rainfall, 16.46in.)

PRESENT.—**MESSES.** T. Dunstone (chair), C. H. Zweck, W. Pratt, A. A. Schulze, J. J. Clarke, W. J. Ninnes, R. Buzacott, C. Lehmann, T. F. Pedler, S. G. Shepherd, M. Williams, M. G. Best, D. Crawford, jun., J. T. Bishop, J. Williams, H. Newmann, E. C. Deland, J. S. McEwin, H. W. and W. O. Eime (Hon. Sec.).

FARM HOMESTEADS.—Mr. A. L. McEwin dealt with this subject in a paper. In selecting a site for the homestead, he said, due consideration should be given to the necessity for a central position from which to work the farm, the water supply, convenience to the road, and the level of the country. A place likely to be flooded by a heavy fall of rain or to become a quagmire in winter was not desirable. Continuing, the paper read:—“Probably the most important of all is water; hence in the older communities homesteads are found in almost inaccessible places. At the present day there are so many appliances for raising water that there is not the need for the same consideration to be given it, but general convenience for working the farm as a whole, and a position for the improvements that will likely be required, also a place that can have its surroundings beautified, can be given due regard. A farmhouse should be built to be comfortable, and have all up-to-date conveniences, such as bathrooms, &c. I am well aware that cost must largely enter into calculations when starting farming, as to be up to date in it makes it one of the most expensive callings. But when a farmer has been on his farm for from 10 to 20 years, or longer, he should be able to make things comfortable; and certainly the place should be beautified, otherwise the success cannot be worth all the worry and labor expended. The amount that a person will expend on his homestead depends very much on the size of his farm. For a farm of 800 acres and upwards, I estimate that it takes anything from £1,500 up to £3,000 to have anything like an up-to-date homestead. The house may cost anything from £500 to £1,500; stables, £150; hayshed, to hold 100 tons hay, £100; machinery shed, £100; barn, £100; engine and chaffhouse, £75; blacksmith shop, £25; man's house, £150; fowlhouse, £25; sheepyards, £25; cowshed, £15; pigsty and yard, £10; water improvements, including windmill, tanks, and troughing, £200. These prices are based roughly on all outside improvements being done with wood and iron, and are rather under than over the mark. The stables, hayshed, engine and chaffhouse should all be placed together, and built with a 30ft. span. The hayshed should be 16ft. to 18ft. high, with a hip roof. The barn and implement shed should be adjoining, with running doors at either end; 50ft. by 30ft. gives ample room for both sheds, the sides being 9ft. high, with a hip roof. The blacksmith shop may be alongside of either, and the sheepyards convenient to the barn, as it is generally turned into a shearing shed when required, and the machinery shed can also be used as a sweating pen. The other accommodation should be placed where convenient. None of these improvements can be done without on an up-to-date homestead. Stables and all places where animals are to be kept or used should be situated south-east of the homestead, for it is rare that a south-east wind is strong, and it blows less from that quarter than any other in this part of the country. They should be compact, without being crowded. No building should be within 150yds. of the dwelling-house for many reasons; one, in case of fire; another,

it allows the home to be beautified by tree-planting and gardening of flowers, fruit, and vegetables. Flowers and shrubs of some kind can be grown in practically every district. Trees add to the appearance of the homestead and provide shelter as well as being ornamental, and 200 trees planted each year will in time make a good show if only 25 per cent. of them grow. They should not be planted too close to the dwelling-house. A man starting with small capital has to fit things according to the amount he has at his disposal, and it is wonderful how one can manage by carefulness and economy. It is well for the farmer to go slow on improvements until he can see his way clear to pay for what he is putting up. Improvements mean saving as well as convenience when they can be paid for, but when interest has to be paid on their cost this is doubtful. A homestead should be carefully planned out with the idea of having things up to the mark in the future. If carefully arranged and looked after it should be neat and comfortable. Straw sheds, which are largely going out of date in this district, can be made to look neat, and are certainly the most comfortable that can be put up, being warm in winter and cool in summer, if they receive a little attention from time to time. I have been to farms of reputably well-off men where the sheds and out places looked as if they had not been touched for years. A few days round the homestead clearing up rubbish and tidying up is time well spent. A dwelling-house and a stable are the essentials on a new farm. The amount that is put into these should be governed by the capital at command, but not more than a third of that available should be spent. With the present opportunities the Government are giving, a man with experience and £500 should make a fair start, and in a few years be able to get along very comfortably. With experience, economy, and a little 'roughing it,' one may start on much less, but success will depend more on the seasons." Mr. J. J. Clarke thought the amount mentioned in the paper for improvements was too much. One hundred pounds would do for a homestead as a start in new country. Mr. W. Pratt said the person who purchased land during the past few years would not be able to put up such expensive improvements. Mr. Dunstone thought the best place for a young man with a fair education was on the farm. He would get a wage that would enable him to save sufficient within a few years to start for himself. It was unwise for him to lay out too much in expensive improvements.

Clare, May 23.

(Average annual rainfall, 24·30in.)

PRESENT.—Messrs. D. Menzie (chair), F. and C. Pink, E. Kelly, E. Victorsen, P. R. Pascoe, J. Scales, C. T. Jarman, F. G. Hicks, M. L. Nolan, W. Patullo, F. J. Knappstein, A. Hill, P. H. Knappstein (Hon. Sec.), and one visitor.

RIVER MURRAY SETTLEMENTS.—Mr. C. T. Jarman contributed an interesting and instructive paper descriptive of various features which had impressed themselves on his notice during a trip along the Murray River. The following is extracted as being more particularly of interest to fruitgrowers:—"With respect to the handling of the currant vine, growers in this district may feel satisfied that they are right in the van as regards methods, and the results obtained in our best vineyards compare very favorably with the best I saw in the River valley. The pruning with very few exceptions has settled down to rod and spur. A few follow the practice of leaving the secondary arm with four or five spurs bunched at the ends. This they claim acts as a T-piece trellis, with one single wire along the top about 18in. above the T. The vines then grow in the form of an umbrella, and this gives shelter from the hot sun, and the fruit ripens better. This may apply to Mildura on account of the heat, but in our district it is not required. The majority of growers of any size are using racks for drying. Most of them are fixing the wires permanently to the posts, after passing the former through the mesh and putting four or five trays one above the other. This leaves room for working the currants on and off the wires. The picking is done in boxes, which hold a little more than half a kerosine case, and buckets made almost the shape of a kerosine tin with the side cut out. *Sultanas*.—This vine seems to give more regular crops under irrigation, and to bear under various systems of pruning. Some growers advocate and practice cincturing, while others contend that it is a snare and a delusion. One prominent grower said he had proved that after two years of cincturing, the sultana went back. Some practice a modification of the complete ring, and run a cut around the canes. This may be a method which it would be well to try in this district on vines that are very vigorous, but I would advise caution. In picking they have a bucket made of perforated zinc and holding 10lbs, or 12lbs. of fruit,

They are taken to the vines, and the pickers fill them, cutting the bunches where necessary into small pieces. They are carted to the dip on a low trolley, dipped, and placed on the trolley again, and conveyed to the drying ground or rack. Some of the growers are using the racks for drying sultanas, and one said he secured the best results from fruit dried in this way. Here again their hot climate favors them, for I do not think it would do here. One of the most successful sultana growers used a dip of 1lb. caustic soda to 20galls. of water, with an in and out dip. The skin is tender under irrigation and requires weaker solutions. *Apricots*.—This fruit appears to be going back, and I noticed quite a number of orchards where they had nearly all died out, and I do not think that any replanting is going on. *Peaches*.—These seem to find more favor, and I saw some splendid gardens, where the fruit seems to do remarkably well. The best were at a new settlement in New South Wales, near Wentworth, called Cushoaa. Trees two and a half years old, grown by Mr. Taylor, were indeed a sight, and others only three and a half years old, grown by Mr. Sage (an old South Australian), were carrying immense crops of lovely fruit. This gentleman expects to take off three tons of dried peaches per acre this year. This will net something over £150 per acre. His method of sulphuring is to place the sulphur box (which is made of a deal frame covered with calico and whitewashed) over the trays, leaving a small draught hole at the bottom and several vents at the top, with the result that a circulation is caused with the sulphur, and a better color is obtained without saturating the fruit to the same extent with the fumes." In reply to questions, Mr. Jarman mentioned that he had seen peach trees over seven years old bearing good crops. Sultanas, he thought, were coming very much into favor.

Gawler River, June 20.

(Average annual rainfall, 17in. to 18in.)

PRESENT.—Messes, W. Rice (chair), E. Winckel, C. Leak, H. J. Dawkins, F. Bray, E. White, A. J. Bray, J. Hillier, W. Roediger, P. T. Hill, F. W. Roediger, A. M. Dawkins, S. Pederick, B. F. Hillier (Hon. Sec.), and two visitors.

PRUNING FRUIT TREES.—Mr. F. Bray (who had attended the pruning lectures delivered by Mr. Geo. Quinn) gave a very interesting and instructive explanation of the methods of pruning apricot, peach, pear, and apple trees. After explaining the reasons for pruning, *i.e.*, the regulation of the crops, correction of the shape of the trees, and keeping them to reasonable size to permit of the easier gathering of fruit, and allowing of the proper distribution of air and sunlight to all parts, Mr. Bray demonstrated, with the aid of some limbs of the different trees mentioned, the methods of pruning referred to.

Salisbury, June 3.

(Average annual rainfall, 18.57in.)

PRESENT.—Messes, Moss (chair), McNicol, E. V. Harvey, Tate, Frost, Illman, Neal, Judd, Hooper, Whittlesea, Short, Urlwin, Baylis, Day, Jenkins (Hon. Sec.), and three visitors.

POULTRY.—Discussion took place on this subject. Mr. Frost had been keeping fowls for 26 years, and he favored running them in the open. Mr. Day believed in enclosing the poultry. The farmer could feed the birds for at least 1s. per head per year cheaper than the person who had to buy food. The average annual production of eggs by farmers' fowls could be considerably increased without increasing the cost of feeding. Egg production was more remunerative than breeding for table purposes. Any food that had a tendency to ferment was detrimental to the health of the hens. They required warm, clean houses. Success in incubation depended to a large extent on the stock birds, which should be in good health and condition. Mr. Moss preferred an open run with plenty of shelter. Mr. Neal kept Black Orpingtons and White Leghorns, and was securing a good supply of eggs at present.

SEEDING OPERATIONS AND HARVEST RESULTS.—At a previous meeting a number of members supplied information regarding the methods they had adopted in preparing their land for seeding, and the results which had been obtained at harvest. Mr R. C. Whittlesea fallowed in July to a depth of 4in., and rolled and harrowed the ground in

September, cultivating it during the same month, as well as in January, April, and June. The seed was drilled in June, harrowed eight days after, and rolled in July. Le Huguenot, Baroota Wonder, and White Tuscan wheats were sown with 1cwt. of guano super. to the acre. The whole area was cut for hay, and the results were as follows:—Le Huguenot, 2 ton 5cwt. per acre; Baroota Wonder, 2 tons per acre; and White Tuscan, 1 ton 15cwt. per acre. Mr. F. Frost commenced fallowing in July and finished in August, ploughing to a depth of from 4in. to 5in. The land was then harrowed, rolled, and cultivated, harrowed and cultivated again in October, rolled, cultivated, and harrowed during March, and cultivated and harrowed in May. Baroota Wonder and Le Huguenot wheats in equal parts, and Baroota Wonder wheat and oats in equal quantities, were sown during the latter part of May and up till June 10th with about 1½cwt. of super to the acre. The average yield of hay was 2 tons to the acre, the earlier sown portion not being quite as good as that sown in June after rain. The crop on land ploughed in July was not as good as that on land ploughed in August, but otherwise treated similarly. The whole area improved wonderfully following harrowing just after the crop came above the ground. Mr. E. Tate ploughed in July and August and harrowed the ground immediately afterwards. He scarified the first crop of weeds, and put this implement over the ground after any heavy falls of rain, i.e., three or four times before seeding. Baroota Wonder wheat was sown during the first week in May with from 1½cwt. to 2cwt. of manure to the acre. The yield of hay per acre averaged from 2½ tons to 3 tons. Mr. T. Judd harrowed his early fallowed land early in September, and portion was gone over with a heavy roller. It was scarified late in September and cross scarified in October. The late fallow was scarified at this time also. Baroota Wonder, Dart's Imperial, and Le Huguenot wheat, and Algerian oats were sown in dry weather (with the exception of seven acres sown after rain) with about 1cwt. of mineral super. to the acre. The soil was not disturbed after drilling until rain fell, when it was harrowed. A portion harrowed five or six days after the rain produced a much better crop than that treated two days after the fall. Le Huguenot wheat mixed with Algerian oats produced the best crop, and the area fallowed in October yielded the heavier return. Mr. Shepherdson ploughed his fallow in August to a depth of about 5in., and broke it up well about a month after with the cultivator. A fortnight later it was rolled and again cultivated in the opposite direction. Slightly over 1bush. of Early Gluyas wheat was broadcasted in May, and 2cwt. of mineral super. per acre were added. The yield averaged about 2 tons of hay to the acre; whilst late varieties of wheat appeared to suffer considerably from the dry weather when coming into ear. Gluyas did not show indications of being affected.

Two Wells, June 17.

(Average annual rainfall, 16·36in.)

PRESENT.—Messrs. W. S. Cordon, A. A. Wilson, R. Baker, H. P. Pederick, A. Pratt, J. Williams, P. C. Cooper, A. Rowe, E. Green, H. J. Wasley, L. H. Dawkins (Hon. Sec.).

DAIRYING.—In a short paper on this subject Mr. P. Cooper said land selected for dairy farming should be capable of growing early and summer feed. A good milking shed could be made from wood and iron, carefully whitewashed, and provided with a brick floor covered with cement. A large and a small yard were necessary, and the cows should not be allowed to go back through these after being milked. If the milk were being sold, he recommended the Holstein cow, but if butter were the objective, the Jersey was preferable. A good type of cow was one wide between the eyes, possessing a thick neck, square back, handy-sized teats, roomy barrel, with nice veins underneath, and plenty of room between the thighs. The animal should give about 3galls., testing about 4 per cent. of butter-fat. The cow yielding this quantity of milk usually remained in longer than one giving 5galls. They should always be kept in good condition, irrespective of whether they were in milk. Oaten hay was best for dry feeding, this being damped about 12 hours before being used. Ensilage was very good, and when maize was being sown in this district it should not be put in too early, as there was a danger of it suffering from frosts. A milk fever outfit should always be kept on the farm. Fresh and stale creams should not be mixed until they were of even temperatures. The separator should be washed with boiling water, and if butter were made on the farm, there should be a good supply of milk for pigs and for rearing calves. Cleanliness was of the utmost importance in dairying. Members agreed with the ideas of the writer of the paper.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

Bute, June 18.

(Average annual rainfall, 15'42in.)

PRESENT.—Messrs. E. W. Bettess (chair), W. Sharman, A. Schroeter, W. J. Hall, W. Heinrich, J. Trengrove, S. Trengrove, H. Schroeter, W. Buchanan, W. T. Matthews, J. Trainor, M. Stevens, L. E. Simon (acting Hon. Sec.), and one visitor.

PICKLING SEED.—Mr. J. Trengrove preferred bluestone for pickling wheat. He had used Fungisine for treating smutty barley, and secured a crop equal to 50bush. to the acre of good, clean grain. Mr. Schroeter had used Fungisine on smutty wheat, but the grain failed to germinate.

CHAFFING HAY.—The general opinion of members was that five-eighths of an inch was the best length for chaff. For young stock it could be, if anything, slightly longer which would result in better mastication, but for old animals probably it would be better slightly shorter.

TAKEALL.—Mr. A. Schroeter thought that this disease affected wheat with a coarse or thick hollow straw more than one possessing a thin solid straw. Mr. S. Trengrove said hay blight was more prevalent in wheat sown in dry land or land worked in a dry state. Mr. L. E. Simon agreed that this was so, more especially on stubble than on well-worked fallow. Members generally favored harrowing after the drill, even if the sowing was done in dry weather. Harrowing after a good rain had shown good results, even after the crop had appeared above the ground.

Moonta, June 21.

(Average annual rainfall, 15'22in.)

PRESENT.—Messrs. J. Atkinson (chair), H. Fuss, J. Hall, J. Andrewartha, J. Luke, W. B. Stacey, T. R. Luke, J. M. Browning, C. J. Chapman, J. Lawry, R. C. Kitto, W. J. Brinkworth, W. F. Ortloff, J. Cooper, R. A. Hancock, T. Laidlaw (Hon. Sec.), and one visitor.

BI-PRODUCTS OF THE FARM.—Mr. W. B. Stacey read a short paper in which he advised farmers to breed a few foals to take the place of old horses in the teams. He preferred the Percheron breed, which possessed a good body, clean legs, and was very active. Cows should be kept to supply the household with milk and butter, and if room were available the calves could be reared and sold at two or three years of age. Sheep were profitable, and the returns secured from the wool of a flock on dirty land would frequently be greater than that from a wheat crop. Pigs kept until they reached 60lbs. or 80lbs. in weight, and then sold, would be found payable. For bacon he preferred the Berkshire, but for factory curing the yellow Tamworth. Four-acre paddocks sown to barley and peas should be provided. Barley should also be stacked in the straw and fed to the pigs when the small paddocks had been eaten out. There was an ever increasing demand for turkeys, geese, and table poultry, as well as eggs; and these lines, if intelligently cared for, provided good returns. Mr. Kitto drew attention to the neglectful manner in which sheepskins were frequently treated on the farm.

WESTERN DISTRICT.**Colton, June 21.**

(Average annual rainfall, 17'01in.)

PRESENT.—Messrs. E. H. Whitehead (chair), W. A. Barns, P. P. Kenny, R. Hull, F. Shepard, Geo. Lewis, M. D. Kenny, Ger. Lewis, L. Larwood (Hon. Sec.), and one visitor.

SEEDING OPERATIONS.—In a paper on this subject Mr. D. Kenny said he ploughed a 150 acre paddock to a depth of 4in. during July and August, 1911. It was skim ploughed

to a depth of about 2½ in. and harrowed by about the 15th of May. The surface soil was dry, but just underneath it was moist. In ploughing he turned up a fresh surface to the air, consequently there was a considerable loss of moisture. Rain fell on the 12th June and between the 18th and 30th June; 60lbs. of wheat and 70lbs. of super. per acre were distributed over the land, the harrows following the drill. The average return was 9bush. to the acre. An adjoining paddock of 40 acres was summer ploughed in February, harrowed twice after rain on June 12th, and after the drill; 65lbs. of wheat and 60lbs. super. per acre were sown. The yield averaged 15bush. Another paddock alongside was ploughed to a depth of 4in. in February and March, and was sown about June 10th with 60lbs. of wheat and 50lbs. of super., the harrows following the drill. An average yield of 5bush. per acre was received. There had been no rain, and the ground was very dry. The practice he adopted for the present year was to plough to a depth of about 4in. in July or August, harrowing the land after the plough and after every rain; in all it had been harrowed six times since August. He was now drilling with 37lbs. of wheat and 40lbs. of super. one way, and the same seed and super. crossways, harrowing after the drill. The harrows dragged out the weeds and kept the surface of the soil loose, which had the effect of checking evaporation. A nice seed bed, also, was secured. A lengthy discussion followed. Members were of opinion that harrowing after ploughing and then after rains created a fine tilth on top and thus helped to conserve the moisture in the ground. The harrow only disturbed the surface and killed many of the weeds. Skim ploughing was not suitable, as it went too deep, loosened up the pervious soil, and evaporation went on too freely, especially here where the soil was light and porous.

PHOSPHORUS POISONING.—Mr. Shipard advised members of an economic and safe cure for phosphorus poisoning, viz., dissolve a teaspoonful of Condry's crystals in a wine-glass. Mix this solution with half a whisky bottle of water, and drench the animal. He had given this to a cow which had eaten about a double handful of phosphorus and pollard, and a cure was effected.

Elbow Hill, June 14.

(Average annual rainfall, 11in. to 12in.)

PRESENT.—MRSSES. W. T. Cooper (chair), J. Brooks, A. Chilman, A. Ramsey, H. Wheeler, F. Freeth, P. Wake, A. McCallum, G. F. Wake (Hon. Sec.), and three visitors.

INITIAL COST OF FARMING.—Mr. P. C. Wake read a paper. He took as a basis a farm of 1,000 acres rented from the Government at 4d. per acre, the lessee having a capital of £700 or £800. It would be necessary to get 200 acres cleared, which would cost 10s. per acre, a total of £100. Additional expenses would be a small tank, £30; nine horses at £30 each, £270; harness and tackling, £18; stable and implement shed, £30; eight-furrow plough, £48; drill, £48 (payment for these two could be spread over three years); harrows, £10; horse feed, £30; binder £45 (payment for which could also extend over three years); seed wheat, 50 bags at 10s. £25; manure, 5½ tons, £23; small wagon, £50. For fencing the holding netting could be obtained from the council: five miles could be secured for payment at the rate of £4 10s. per year: posts could be secured on the land, and barbed wire would cost £10. A harvester would cost £90 (one-third of this being paid each year for three years), and bags and twine £16. Living expenses would involve £75, and the hire of labor £25. Thus the total expenses for the first year would be £800. In the event of a 12bush. average being reaped, after deducting 80 bags for seed, and cutting 30 acres for hay, the net harvest would equal 600, which at 10s. per bag would return £300, leaving a debt of £500 3s. 4d. During the second year 300 acres could be put in, the additional 100 acres having been cleared at a cost of about £40. Second instalments on implements, super., bags, rent, labor, and living expenses would bring the debt to £733 3s. 4d. Assuming another 12bush. return, 100 bags kept for seed, and 40 acres cut for hay, the actual harvest of 940 bags would sell for £470. Fowls, cows, pigs, &c., might bring in £15, and five foals which could be bred during the two years should realise £12 per head. These sums deducted from the expenses left a debit of £188 3s. 4d. Four hundred acres could be cropped during the third year, the outgoing cash amounting to £460. The net return from the harvest on a 12bush. average should be £670, which, with side lines, should be increased to £733. This would leave a credit balance of £270, with machinery and implements paid for. He did not think a person could successfully commence farming on £500. Mr. Wheeler, however, thought this could be done. The Chairman advised the purchase of second-hand implements. The perseverance of the farmer and attendant circumstances were factors of considerable importance.

Koppio, June 19.

(Average annual rainfall, 22·40in.)

PRESENT.—Messrs. J. Newell (chair), T. Brennand, H. Thompson, W. Jericho, G. Howard, J. Graham, C. B. Gardner, T. R. Gardner (Hon. Sec), and two visitors.

AGRICULTURAL LABOR.—The following paper was read by Mr. T. Brennand:—"The growing scarcity of experienced and reliable farm hands, together with the high rate of wages demanded by farm laborers, is evidently becoming a serious problem to the farming community who cultivate large areas and have to employ men. There seems to be a great lack of experienced men. I think most farmers like to have good men, and are quite willing to pay good wages to suitable men, if they are lucky enough to procure them; but rather than be troubled with men who do not understand the work, they have to get assistance from neighbors, or get along as best they can without. On the other hand, a good man likes to have a good master, and will not seek work with a farmer who will not give him fair treatment. An employer who persists in grumbling about every little thing that does not quite suit him, gets very little respect from his servant. This kind of employer usually fails to see when a man is trying to do his best for him. The result is that the man takes the first opportunity he gets to leave his service and seek a more congenial situation. Fortunately there are not many of this kind of farmers, but they do exist, and because of the fact many capable men do not care to take up farm work. As a possible means of solving the labor problem, I would like to call your attention to a portion of the address given by the Hon. F. W. Young at the Conference of Northern Branches held at Quorn, which appears in the March number of our *Journal*, page 886. The suggestions given are in my opinion sound and commonsense, and if put into practice especially in the old settled districts, should eventually provide much of the necessary assistance needed by farmers and producers. In discussing the subject, members generally agreed that it was advisable to have a married couple on the farm if the expense was not too great.

Mangalo, May 17.

(Average annual rainfall, 14in. to 15in.)

PRESENT.—Messrs. A. G. Burton (chair), S. Burton, W. Waters, H. C. McMartin, J. W. Doer, J. C. Busch, M. Burton, J. Meiglicch, H. Mackley, jun., J. H. Cleave (Hon. Sec.), and four visitors.

WATER CONSERVATION.—In initiating a discussion on this subject, Mr. J. C. Busch recommended the erection of dams across water runs or small creeks, providing sufficient good holding clay was available. Cement tanks were good, or ordinary dams might advantageously be covered in to prevent undue evaporation, which he considered was responsible for a loss of about 4ft. of water annually from the ordinary farm dam. Mr. S. Burton thought that as good clay was available here, dams, with well-cleared runs, were serviceable. Water caught on roofs, &c., should be stored in cement tanks, as it would then be available should the supply in the dams run short. Mr. W. Waters recommended the following method of making dams:—First scoop out as much earth as could be ploughed to a convenient depth, then pick out the ends, elevating the loose earth by means of two buckets on a derrick. Provided the clay was of good quality, he would build a 'dry' stone wall, and pack the clay well behind. Tanks made after this fashion would be serviceable for years. When starting farming on new blocks, where water was not available, a good plan was to spread out a ton to a ton and a half of galvanized iron on the ground to provide a catchment. When dams or tanks had been provided, the iron could be used for roofing. Mr. H. Burton had found that a dam about 22yds by 18yds, by 2½yds. on a good run would keep from 40 to 50 head of stock through the summer. This would also be much cheaper than cement tanks. Mr. J. W. Doer had, with the assistance of one man and three horses sunk a dam 20yds. by 17yds. by 2½yds. in a fortnight. It was advisable to make these as large as possible, as in the event of thunderstorms a large supply would be caught. Well-sinking was advisable. If water was struck, the supply was generally permanent. Mr. H. Mackley jun., preferred damming watercourses and small creeks. If a good clay holding ground could be found, the banks could be scooped out. It was a good plan to use the divining rod along water runs. If the rod indicated the presence of water, possibly on sinking a soakage would be found, which would ensure a good supply. The Hon. Secretary thought the catchment provided by iron amply justified the use of this for roofing. Very light falls, that would not run on the ground, would provide water from iron roofs. Time and labor involved in water-carting would

thus be saved. Members were agreed that in the majority of cases the divining rod was not successful. It was generally agreed that it was better for stock to drink from dams than to draw the water for same.

Miltalie, May 17.

(Average annual rainfall, 14'55in.)

PRESENT.—Messrs. P. G. Wilson (chair), J. P., I. W., and E. Story, I. R. Hill, W. G. Smith, A. M. and M. H. Wilson, S. R. Searle, H. R. Jacobs, T. A. Wilson (Hon. Sec.), and five visitors.

MALLEE SHOOTS.—In a paper on this subject, Mr. Searle said the problem of the destruction of mallee shoots was a very difficult one. Ploughing instead of disking new land the first year killed a number of the surface roots, and loosened and pulled out many of the stumps. It would pay to sow oats on sandy ground, as there was a better chance of securing a good burn, especially if the fire rake was used, than was the case with wheat. He secured a fire rake three years ago, and strongly recommended this as being the best and cheapest means of dealing with the shoots. Last year he used it on a sandy paddock, and although the crop was thin, it was difficult to secure sufficient shoots on which to build the stump heaps. 'Three years' use of the fire rake would do more good than 12 years with the shoot hooks. Where the land was firm, a heavy disc plough would cut a considerable number of shoots if they were not too young; but they were not permanently destroyed. The more the land was worked the weaker the shoots became. Whilst they might be stronger than usual on fallow land, the wheat plant also was stronger: but generally there would be fewer shoots to cut. It was a mistake to clear more land than could be worked, as the rubbish caused the soil to become sour and it would be found necessary to go over the work again. Members agreed that the best plan was to plough the land the first year, as stumps were pulled and roots broken. The following year a disc implement would cut 50 per cent. of the shoots. Fire was the most satisfactory means of destroying shoots and stumps. By the use of the fire rake one could choose the time for killing the shoots. It was more effective to cut them before seeding, and they should not be cut too short. Water mallee shoots were the hardest to destroy.

Petina, May 24.

(Average annual rainfall, 13'19in.)

PRESENT.—Messrs. W. Penna (chair), E. Keeley, W. G. Lewes, O. J. Howard, H. Doley, W. L. Schultz, J. Souter (Hon. Sec.), and two visitors.

THE PETROL ENGINE.—Mr. O. J. Howard read a paper in which he described minutely the different parts of a four-cycle petrol engine. The paper then continued—The various parts work in the following manner:—The engine is at rest, and the piston is at the beginning of its stroke, at what is called dead centre. Both valves are closed. The crank is turned to put the various parts in motion. As the piston moves outwards it creates a vacuum, or suction. The inlet valve opens (if of the automatically-operated type the suction alone opens the valve, if mechanically operated it is pushed open and held open by the tappet rod). The air rushes through the choke tube in the carburettor, sucks up and evaporates enough petrol to form an explosive mixture, and enters the cylinder through the inlet valve. When the piston reaches the end of its stroke the cylinder is full of an explosive gas. The inlet valve now closes. This completes the first cycle. The momentum of the flywheel and the power applied to the starting handle force the piston back into the cylinder. As both valves are closed the gas is highly compressed. The compression in a motor engine is most important. A very slight loss of gas will cause a considerable loss of power. The cylinder full of gas is compressed into a very small space in the cylinder head. The moment before the piston reaches dead centre the platinum points in the contact breaker of the magneto separate. This causes a spark at the points of the sparking plug inside the cylinder. The gas under compression ignites easily. This completes the compression stroke, or second cycle. The gas explodes with great force, driving the piston forward and turning the crank by means of the connection rod. This is the power stroke or third cycle. The instant before the piston reaches the end of its stroke the exhaust valve is pushed open by the tappet rod. The burnt gases are swept out of the cylinder by the incoming piston. This is the exhaust stroke or fourth cycle. When the piston reaches dead centre the exhaust valve closes, and the inlet valve starts to open to admit a fresh charge. The outgoing piston sucks

in a new charge, and so the cycle of operations go on automatically. We see in a four-cycle engine there are four distinct operations—suction, compression, power, and exhaust—so that we only get one power stroke every two revolutions. There are on the market at the present time two-cycle engines that give a power stroke every revolution. I will not go into detail of construction, because I do not think they are suitable engines for the average farmer. In expert hands they are very reliable and serviceable, but not so economical as the four-cycle engine. I will point out the most likely troubles the farmer will have with his engine. The engine may refuse to run because—(1) The petrol may have become stale, that is, the most volatile part has evaporated. The mixture drawn into the engine is not rich enough to fire if the engine is cold. (2) The jet or spray may be choked up more or less by fine fluff or dirt. This is a common cause of stoppage. (3) Water in the carburettor is also a common cause. *Magneto*.—The platinum points may be dirty, or pitted, or perhaps covered with oil or water. To remedy, clean with emery paper. The carbon-collecting brush at the end of the high tension cable may be dirty with oil. Unscrew and clean with benzine. The plug points may have worn too far apart. Space apart about thickness of thumbnail. Porcelain of plug may be covered with a carbon deposit or oil. Unscrew and clean. *Cylinder*.—Dirt under one of the valves, or valve stem stuck in guide by congealed oil, dirt, &c. If this is the case the engine will have but poor compression. To insure good running, the engine should be kept clean and dry; the petrol should be passed through a fine gauze strainer; the magneto should be kept clean, especially the contact breaker; the cylinder should be properly lubricated with special cylinder oil; the sparking plug must be kept clean, and the points properly adjusted; all nuts must be kept tight, and all moving parts well oiled. If the petrol engine is given proper attention it will be found to be one of the most useful and reliable pieces of machinery on the farm." [The writer also displayed a colored sketch of a petrol engine, showing the various parts named. Owing to pressure on space the first part of the paper dealing with each part in detail has been omitted.—Ed.]

Shannon, June 14.

PRESENT.—Messrs. W. Proctor (chair), Carey, Habner, Smith, Cronin, Inglis, Roediger, Smith, Cronin, Williams, Wilkins, Smith, Gordon, and J. J. Cronin (Hon. Sec.).

WHEAT-GROWING IN MALLEE COUNTRY.—In a paper on this subject, Mr. J. Carey said that if some farmers put in from 100 to 150 acres less each year, and applied a heavier dressing of super, to the smaller area, they would find it to their advantage. Not only would there be a good return from the extra dressing of manure, but more time would be available for cleaning the land. The stubble should be fire raked at the first favorable opportunity, the day selected being hot, with a fair wind. The land would be sweeter after the burn, and in a better condition for cultivation. A number of shoots would be destroyed, and rubbish lying about on the surface would also be burnt. The plough was a better implement than the cultivator for breaking up new land, notwithstanding the fact that it involved more time. It broke the soil better, and pulled up more stumps. Where it was found that the soil had a tendency to set hard after a good rain, he advised picking all the loose stumps and then going over it with a light cultivator before drilling. If the scrub farmer considered quality more than quantity, given favorable seasons, he should make a success. Mr. Wilkin, while agreeing in the main with the ideas of the paper writer, would not dress new land on which a good burn was secured with too heavy applications of super, unless it was intended to crop it two or three times in succession. Mr. Inglis would crop as much new land as possible in order to get a good stubble burn. Mr. Roediger believed in ploughing new land and pulling out as many surface roots as could be managed.

Utera Plains, May 17.

(Average annual rainfall, 12'06in.)

PRESENT.—Messrs. Sinclair (chair), Abrook, Venning, Hier, H. and G. Hornhardt, See, Rule, Guidara, and Ramsey (Hon. Sec.).

COMMENCING FARMING ON NEW LAND.—The Chairman read a paper on farming in new country. A good many men, he said, had taken up land without fully counting the cost. Two important questions every prospective farmer should ask himself were these: Am I adapted for the life? and have I sufficient capital? If these could

be answered in the affirmative, success should be assured. The paper continued—The man who cannot put up with a few hardships should not entertain the idea of mallee farming. If a man has sufficient capital, undoubtedly the place to start is on new country, either with land under perpetual lease or covenant to purchase. Where his capital is limited, I should strongly advise share-farming. I cannot see how a man is going to start and have any reasonable hope of success in this district for a good many years with less than £500. Help under the Advances to Settlers Act is available, but even with this he would only have a modest beginning. Under the share system, however, a man with £200, a team of horses and plant, and a good name to back him up, could reasonably expect to get a fair start off in five years if free from drought, or other unusual difficulties. In a great many instances, in new districts, like our own, where there are big holdings, the leaseholder is anxious to let some of his unimproved land to share farmers for a term of five years, rolling all necessary scrub and finding all improvements, and take one-third of the profits. The share man clears all land, finds all seed wheat, super., horse feed, and labor, erects all improvements and takes two-thirds of the profits. He could reasonably expect to get 200 acres in during the first year. This should take him about four months, as new land only needs light cultivation the first year. A great many farmers only drill in the seed, but I would strongly advocate going over the land with a twin plough, or time cultivator, to break all the roots near the surface and get out as many stumps as possible to avoid shoot-cutting the following year. Very often a stubble burn cannot be obtained, and I strongly recommend the fire rake as the best up-to-date and labor-saving method of destroying mallee shoots and bushes. After getting his crop in and securely fenced against all vermin and straying stock, he might well employ his time and his team in doing road work, or contracting in many different ways, thus adding to his working capital and keeping his team in good condition in the winter months. In the case of the man with no team or plant, but a small capital, the usual arrangement is for the leaseholder to roll the scrub, find all seed wheat and super., put the crop in and take it off, and receive half the profits. The share man clears the land ready for the plough, erects all fencing, finds half the bags, and carts his own wheat, taking half the profits. He could reasonably expect to clear 400 acres for a cost of £50 and could complete the contract in five months, thus giving him seven months in which to earn money in many other ways to add to his working capital. He could naturally expect to buy at least two good farm horses after the first harvest, and following on these lines for about three years he would have a good team, and perhaps one or two implements that would be useful to him at a later date. I have had some experience with this class of share-farming, and I strongly recommend it to any laborer who is desirous of starting farming. The case is not hopeless by any means, but it is slow work. I advise young men to take up new country if possible, but always to keep within the bounds of their finances. Never buy a machine because it is cheap, always buy the best available; buying on time payment seems to me to be ruinous. In many cases parents start their sons on the land, or else become security for them until they get a footing. Many young men desire to become farmers and have nothing behind them but a small Savings Bank account and their own strength and abilities: men who practically stand alone. The share system, in my opinion, offers the most promising opportunities to them, and the life is free. Members thought no farmer would leave his farm and work on the roads unless forced to do so; even then he should not neglect important work on his holding. Share-farming was satisfactory in good seasons, but there was little in it in dry years. The fire rake was very useful where mallee shoots were giving trouble; it would do good work in their stubble that would not carry a good burn.

Yabmana, June 14.

(Average annual rainfall, 15·14in.)

PRESENT.—Messrs. J. N. McCallum (chair), J. F., A., and J. T. Robertson, H. P. and A. McCallum, F. A. and A. Beinke, J. H. and C. Frost, L. G. Strother, G. W. Story, J. T. Pongelley, M. K. Frost (Hon. Sec.), and six visitors.

PLOUGHS.—Mr. A. Beinke read a paper in which he stated that for farming in hilly country one could not do better than secure a spring pressure plough, as it did equally good work when going up or down hill. When stumps were numerous, also, this implement was more satisfactory than the bridle draught plough, as when it cut into a thick patch of stumps, it frequently happened that two or more of the furrows jumped at once. With the bridle draught plough frequently these would become jammed. With the spring draught plough this difficulty rarely occurred, as each plough had its independent pressure. Members generally agreed that the spring pressure was better than the bridle

plough. Mr. J. N. McCallum mentioned that the spring pressure cultivators were not altogether a success, owing to the springs becoming weak through being left out in the weather. Mr. Story had worked a spring plough for a few years, but had reverted to the bridle plough, as the cost of keeping the former in repair was too great. Mr. J. F. Robertson had used a spring plough for four or five years in many varieties of ground, and had experienced little trouble with it. There was less jar on the horses' shoulders. In reply, Mr. Beinke mentioned that he had ploughed approximately 1,000 acres with his spring plough, and there was no sign of a weakening of the springs. The implement jumped stumps in a satisfactory manner.

Yadnarie, May 17.

(Average annual rainfall, 14·09in.)

PRESENT.—Messrs. W. L. Brown (chair), F. W. Dreckow, F. H. Stubing, J. A. and F. C. Kruger, F. W. and A. H. Jericho, A. Spriggs, B. B. Crosby, S. H. Pearce, and five visitors.

FARMING.—Mr. Crosby read a paper on this subject. While there were areas on which it was impossible to succeed however hard the farmer worked, he said, there were stretches of country which adequately repaid money and energy expended on them. Frequently there was an excellent asset in growing timber, which could be carted during winter months. Stumps could be disposed of at from 5s. to 9s. 6d. per ton; top mallee of good class for up to 30s.; green blackoak poles from 18s. up to 27s.; dry pine at from 8s. to 11s. per ton; good green pine posts at from 6s. to 20s. a ton; and firewood from 5s. 6d. to 10s. per ton. The weeds on some of the paddocks would carry sheep, and return wool equal in value to from 5s. to 8s. per acre. Careful management was an essential. Due attention to sheepskins, wool at shearing time, hay, and such matters, would be amply repaid. Mr. Williams, a visitor from Cowell, delivered an address, which was much appreciated.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

Borrika, June 14.

PRESENT.—Messrs. E. H. Huxtable (chair), R. Collins, N. Collins, J. Waters, jun., L. G. Huxtable, J. Woods, J. L. Sandercock, W. Mayfield, T. Wright, A. E. Seary, A. E. Hart, J. H. Grey, G. Bowden, V. V. Brown, G. L. Bonython, J. B. Tonkin, R. J. Stephens, H. J. Stephens, H. A. Weber, H. S. Green, P. J. Marker, H. Richards, C. W. B. Traeger (Hon. Sec.), and five visitors.

SCRUB-ROLLING.—Mr. A. E. Hart read a short paper on this subject. It was advisable, he said, to commence rolling mallee in September or October, and finish in November. By October a certain amount of sap had risen in the scrub and this was lost to the roots. October rolling also meant that the mallee had three months in which to dry, and shoots had time to grow before a fire was put in. He had rolled mallee in August and September, and again in February, burning it only once, and in 12 months time no difference was noticeable so far as shoots were concerned. A knife or blade roller was most suitable on land where there was a growth of broom, but it was not of much value in mallee, and was also heavier in draught. Six horses were necessary on the knife roller, unless the mallee was very light, when four would be sufficient. A suitable size of roller was 10ft. in length and 2ft. in height for low scrub, but a 2ft. 6in. roller was better for heavy scrub.

Claypan Bore, June 17.

(Average annual rainfall, 16in. to 17in.)

PRESENT.—Messrs. J. Gray, S. Gray, H. Colwill, E. Colwill, S. Hill, C. Hill, C. Dunstan, Russell, McCormack, J. A. Entwistle, F. S. Tall (Hon. Sec.), and two visitors.

FALLOWING.—The following paper was read by Mr. Russell:—"In dealing with the objects of fallowing, first and foremost stands the conservation of moisture. The quantity of moisture which passes through the tissues of a plant is enormous, estimated to be in wheat 300 times the weight of the dry matter. Tilled land will absorb 40 per cent. of its weight of water, while untilled will absorb but 20 per cent., so that the longer the period between fallowing and seeding the greater will be the quantity of moisture stored. Secondly, fallowing, if well carried out, insures a consolidated seed bed of good tilth at seeding time; a mere ploughing is not sufficient for this, but provides a nursery for such weeds as mustard, thistle, drake, &c., which not only choke the succeeding crop, but waste the moisture stored by fallowing. Thirdly, by keeping the soil loose, open, and moist, it favors the growth of beneficial micro-organisms which live in the upper layers of the earth. The activities of these tend to make the soil reproductive. Fallowing also has the effect of hastening the sweetening of the soil particles, makes the whole body of the soil lighter, more porous, and more permeable to roots. Last, but not least, it is an aid, by starving the hosts, to the eradication of the dreaded fungus 'takeall.' A few farmers in South Australia have tried autumn fallowing with beneficial results. Here, however, the trials of wheat-caring are usually too severe to admit of this. However, I recommend commencing on the land to be fallowed with a light disc implement soon after harvest. This allows the rain to penetrate, and also covers the self-sown growth, much of which would otherwise lie on the ground until ploughed. Commence ploughing as soon after seeding as possible, and if completed by the end of August, time will be ensured for subsequent working. The harrows should follow directly after the plough. These drag the rubbish to the surface, and any weeds that have been but slightly loosened are pulled out. By September a good growth of weeds will be showing on that which was first ploughed. It is then necessary to bring into use the scarifier. Cultivating not only kills the weeds, but conserves the stored moisture. The harrows should follow the cultivator. I should just here like to emphasize the advantages to be gained from a free use of the harrows. After rain the soil, especially if of a clayey nature, tends to set in one lump, and consequently its small particles are closely pressed together, forming what are known as capillary tubes, *i.e.*, fine spaces through which water will ascend and evaporate. The use of the harrows destroys this capillarity, assists in the destruction of weeds, keeps the top loose and open, and the subsoil firmed down, which condition is very essential to a crop of wheat. The lighter types of land should be fallowed first, because they are more difficult to consolidate than the heavier. Although fallowing does not add plant food to the soil, it makes available in a form in which it can be assimilated by plants vast stores which would otherwise remain unavailable." Members, in discussing the subject, thought fallowing should be to a depth of 2in. on flats for the first year, the depth being gradually increased yearly. Sandhills should be deep fallowed. It was not advisable to harrow the ground immediately after ploughing, as it was sour, and should be left open. Good ploughing in sand brought up clay, and resulted in a firm surface. Fallowing in this district, it was thought, would be instrumental in raising the average production 5bush. or 6bush. per acre. A heavy roller should be put over land under crop for hay, in order that the binder could cut close to the ground. A good plan was to roll before seeding, and harrow immediately afterwards. Where takeall was troublesome the land should be fallowed and then cropped with oats. Large shoots cut and left on the ground exuded a brown liquid after rain, and this interfered with the health of the wheat plant.

Geranium, May 24.

(Average annual rainfall, 16in. to 17in.)

PRESENT.—Messrs. M. Mitchell (chair), W. J. Mitchell, Norton, F. and W. Hammond Lang, McAniff, Wendlebourne, Lithgow, Bowden, Prouse (two), Nicholls, Jacob, Paige, Dohnt, and six visitors.

FARMING MALLEE LAND.—Mr. F. Norton, sen., read a paper in which he said the method of farming at present practised in this district might be successful during good seasons, but it would be doomed to failure if a run of bad years were experienced. The last three seasons had not been good, and the bush was not being got under as quickly as could be expected. A good burn had been difficult to secure, but a part of the fault lay in the neglect of landholders to take advantage of days suitable for this purpose. The bulk of the soil in the district consisted of sandy loam, which, if gone over at the proper time with a suitable implement, worked up to a good tilth. It readily retained and absorbed moisture, and with a 14in.-18in. rainfall, and cool nights with early and late dews, seed germinated readily and grew well. He had ploughed and cultivated an area

of two acres, and on this broadcasted 7lbs. of lucerne seed and 70lbs. of phosphate per acre, scratching it over with a hayrake. It was doing well. Perennial rye grass and prairie grass also were doing well. Fourteen acres sown with $\frac{3}{4}$ bush. of peas per acre did very well, and he estimated that a $1\frac{1}{2}$ bush. seeding would have resulted in an even better crop. Japanese millet, planter's friend, and amber cane maize had done well, and experiments conducted with Rhodes and couch grasses in the district had shown that these would bind the sand ridges and provide useful fodder. The natural grasses, supplemented by English, on the cleared land should mean that the grazing capacity would be greatly increased. A good deal of the soil was light and sour. It produced straw, but not the grain. This could be overcome by growing rape, peas, oats, by fallowing, and grazing with sheep. More shoots were destroyed by a good burn on a hot day in February than later in the season. He had also tried breaking the bush at the eyes with a light grubbing axe, and the following year only about one-third of the number of shoots had to be dealt with. This was a very good method to adopt after one good burn had been secured. It was not very slow or costly, and the crops secured whilst the shoots were being destroyed in this way were better than otherwise. Fallowing should be commenced as soon after seeding as possible, the land being broken to a depth of not more than 3in. All that was then necessary was to turn it back in September. Weeds grew well, and these could be fed off with sheep, in the absence of which it would probably be necessary to work the land dry, running the risk of the crop being affected with takeall. Sheep not only kept the weeds under, but packed the soil so that the wheat secured a firm seed bed. They created a surface mulch, kept down the young mallee shoots and undergrowth. Their droppings were of considerable manurial value, and their wool and carcasses were sources of profit. If the feed on the fallow was fairly good, they would not be found to wander much into the scrub; consequently, with casual attention they might be safely kept on unfenced blocks, being of course yarded at night. The holding could be sheep-proof fenced as occasion offered, and division fences could be made of pig netting supported by one wooden post every 100yds., with a few iron posts between, and a barb wire on top for large cattle. To keep sheep profitably it was necessary to supplement the natural pastures, and he suggested sowing rape in March in time to catch the first rains, peas after seeding, say early in July, and millet in September. The rape should then be ready for May and June, the wheat and stubble land for July and August, fallow and second growth of rape September and October, peas November, December, and January, and millet, February, March, and April. The inclusion of a small percentage of mustard with the rape had a beneficial effect. Peas could take the place of the bare fallow, and should return from £1 to £2 per acre during the first year if from 1 bush. to 2bush. of seed were sown with $\frac{1}{2}$ wt. or 1wt. of bone super. The following wheat crop also would benefit greatly. Farming could be successfully carried on in this district by paying due attention to the destruction of shoots, adopting a proper system of fallowing, keeping sheep, growing oats as a third crop on all land before fallowing, cultivating peas, rape, turnips, Japanese millet, and systematically planting each year a few acres of lucerne and English grasses, more especially prairie, rye, Rhodes, and Orozopsis.

Hooper, June 14.

(Average annual rainfall, 14in. to 15in.)

PRESENT.—MEMBERS. J. R. Beck (chair), W. H. Boyce, E. Colton, C. B. R. Wright, A. Hood, G. G. Pitt, E. P. Lee, G. Masson, J. W. Murphy, C. S. Hall (Hon. Sec.), and five visitors.

FEDDING HORSES.—In a short paper on this subject, Mr. Hood advised the farmer taking up mallee land to select a team of young horses, as four of these well fed would do as much work as six old horses. About 20 acres of oats should be put in near the homestead, and after these were stripped, the horses could be run in this paddock when not working. During the present season he had tried feeding oats with cocky chaff, and the results had been satisfactory. The oats should be used just as stripped; if cleaned, they would work to the bottom of the mangers, and the horses would eat them and leave part of the chaff. Last year, with the oats stripped from 14 acres, 5 tons of hay, 1 ton of bran, and 2½ tons of chaffed hay, which cost about £17, he fed the horses required to strip about 140 acres of crop, cart the wheat, roll and rake 130 acres of scrub, and plough and seed 242 acres. In the morning he gave each horse two kerosine tins of cocky chaff and one of oats. At mid-day chaffed hay alone; after work at night, two kerosine tins of cocky chaff, well damped, and about 1gal. of bran, and last thing at night a good armful of long hay. After seeding the horses were in better condition than they were

last year, when they received chaffed hay only. Members thought that horses fed on oats would do 10 per cent. more work than those fed on wheat. Mr. Beck would soak the oats before using them.

Monarto South, June 21.

(Average annual rainfall, 14in. to 15in.)

PRESENT.—Messrs. A. Patterson (chair), R. E. Anders, A. P. Braendler, B. J. and H. E. Frahn, J. Hartmann, B. Hoff, A. Harper, H. Hein, G. and R. Paech, A. Schenscher, C. and B. Thiele, E. Tilbrook, H. Zeunert, C. F. Altmann (Hon. Sec.), and four visitors.

FIG-BREEDING.—Mr. A. P. Braendler dealt with this subject in a paper, in which he said it paid to keep pigs where cows were being milked, especially if the farmer was close to a bacon factory or market. If a small number of cows only were in milk, the better plan was to buy pigs six or eight weeks of age and market them at eight months. With the exception of those being fattened, the animals should be provided with a good dry shed in a small paddock, where there was a supply of soft, green grass and water. They should receive milk and corn, care being taken neither to overfeed nor to starve them. When they reached the age of about six or seven months they should be transferred to a warm, dry sty, and fattened for market. For the first week or so they should not receive too great a supply of corn; after that they should be given as much as they would eat of milk with pollard, barley, wheat, or peas, the latter being the best. Dry charcoal should also be provided. The breeding sow should possess a long wide back, long deep barrel, a short snout, and short legs. She should not be mated before she was 10 months old, and a week before farrowing she should be put in a small paddock or sty, and supplied with milk and soft feed and a limited quantity of corn. Raw meat should never be fed, although the healthy, well-fed sow rarely developed a tendency to eat her young. A good animal could be profitably kept until it reached the age of 8 or 10 years, and should yield two litters of 10 or 12 per year. Mr. E. Tilbrook said it was a good practice to have a rail about 10in. above the floor around the sty at farrowing time, to prevent the sow crushing the young ones against the wall. Also, a small amount of bedding should be provided. Mr. Anders preferred peas for fattening. In reply, Mr. Braendler mentioned that on no account should long straw be placed in the sty for bedding; cocky chaff was best. It was necessary, when fattening, to confine the pigs.

Monteith, May 24.

(Average annual rainfall, 14in. to 15in.)

PRESENT.—Messrs. D. J. Travers (chair), P. W. Gregory, A. Wells, J. Rowan, sen., J. F. Connell, J. D. Murphy, Kirby, J. Ferris, C. A. Bentley (Hon. Sec.), and two visitors.

FRUITGROWING.—Mr. P. W. Gregory read a paper. After being cleared, he said, the land intended for fruit trees should be ploughed. If the soil was of a sandy, loose, loamy nature, it need not be worked too deep. Holes for the trees should be large enough to allow the roots to spread. When planting, the tree should be placed in the hole, the roots being combed downwards, and covered with a little sand or loose earth. More soil should be added, and trodden, until the tree was firmly fixed in the ground. The second graft should be well above the surface. In a wet district the earth should be heaped around the stem above the ground level. June and July were the best months for planting. This gave the trees a good start before the hot weather set in. They should be put in 15ft. or 20ft. apart. Old grass or other similar litter scattered on the ground would help to keep it moist. Water should not be applied too close to the butt of the trees. For the first year they should be pruned to a height of from 18in. to 2ft., or if situated in a windy locality between 12in. and 18in. The lateral branches should spring from different points on the stem. They should be kept well open in the centre, and the head should be well thinned out for the first few years. If spurs greater than 1ft. in length were left, the lower portions of the tree would become bare of fruit spurs. The apricot and peach bore fruit on one-year-old wood. One-year-old trees would be found most suitable for planting in this district, as the wind made it somewhat difficult to keep larger trees upright. He had planted nectarines in August, 1911, and they bore during the second year without irrigation. With a high-land water scheme there should be little difficulty in producing large quantities of apricots, peaches, nectarines, grapes, oranges, and currants at Monteith. Members mentioned that quince trees would do well on the swamp, but on account of the windy squalls that were so frequently experienced apple and pear fruits usually fell before maturing.

Morgan, June 14.

(Average annual rainfall, 9·29in.)

PRESENT.—Messrs. R. Wohling (chair), O. Hausler, J. B. Hoffmann, C. A. R. Wohling (Hon. Sec.).

DESTRUCTION OF RABBITS.—Mr. O. Hausler dealt with this subject in a paper in which he advised all landholders to make an effort to clear their holdings of this pest. The present was the best time of the year to deal with them, as the grass was still short and scarce, and the rabbits had not commenced to breed. Farmers in this district would be able to keep an extra 70 or 80 sheep each if they cleared the farms of the rodents, and it was much more satisfactory to kill two now, than have to deal with their progeny in the summer. Members agreed that netting was the best means of dealing with this trouble; this prevented their ingress from adjoining holdings. The Hon. Secretary was trapping on his land, and marketing the rabbits in Adelaide at good prices, the time and trouble being well paid for. The landholder who could not find time to deal with the rabbit himself should offer some encouragement to the trapper, such as finding them in horse feed, or giving them a small amount weekly.

Parrakie, May 17.

(Average annual rainfall, 16in. to 17in.)

PRESENT.—Messrs. F. J. Dayman (chair), O. and C. Heinzl, S. and R. Good, J. O'Hara, J. G. Tomby, A. J. Beelitz, T. Lewis, H. Diener, M. J. Cooney, A. Dayman, F. Gravestocks, F. W. Randall (Acting Hon. Sec.), and one visitor.

THE FARM GARDEN.—Mr. F. W. Gravestocks read the following paper on this subject:—“A garden is one of the best side lines into which a farmer can put his spare time, especially in this district, where unlimited supplies of excellent water can be obtained by means of a windmill. A mill, if well oiled and looked after, is just as well running as standing idle. In selecting a site for a garden many people choose heavy clay, with the idea that the soil is richer. This is a mistake, as most of the common vegetables, such as potatoes, onions, carrots, &c., do best in sandy soils, and these soils do not require so much water. I recommend a piece of sandy loam over a clay subsoil, with a gentle slope, so that it may be flooded by gravitation in the summer. Flooding occasionally is more satisfactory than watering with the hose and sprinkler, as with the latter method a good deal of water is lost by evaporation. After applying a liberal dressing of stable manure, which should be well rotted to get rid of the weed seeds, the ground should be well broken up with a single-furrow plough. As to the varieties of vegetables and time of sowing, I would obtain a gardening guide. These can be had gratis from any of the leading seedsmen. Carrots, lettuce, silver beet, &c., can be sown all the year round. The latter is an excellent substitute for cabbage, and if properly established and well watered will last for years if kept continually cut and not allowed to run to seed. I consider we have an ideal summer climate here for growing tomatoes, French beans, vegetable marrows, melons, &c. I have grown some excellent specimens of these.” In the discussion which followed, Mr. M. Cooney said the majority of authorities on gardening preferred heavy soils for vegetables, with few exceptions. Mr. H. Diener preferred heavy soil and recommended heavy dressings of stable manure. The use of the hose and sprinkler was more satisfactory than flooding in this district. If the watering was done in the evening, very little was lost by evaporation, and the quantity necessary where sprinklers were used was not nearly so large as was the case when flooding was adopted.

CLEANING SEED WHEAT.—Mr. H. Diener read a paper on this subject. A little care taken to sow only clean seed on new land, he said, paid handsomely. A few grains of drake or other weeds in a bushel of wheat were hardly noticeable, but where these were sown with the wheat, in three or four year's time ground that should be quite clean had to be left out and fallowed. In addition to that, the sample secured at harvest was not clean. The use of the grader was strongly recommended. This not only took out all the seeds of weeds, but inferior wheat grain was also culled. If this machine was not available the cleaning could be done with the aid of a winnower, the seed being put through three or four times. Members generally approved of the practice of grading seed, but it was unprofitable if the seed was sown on land that was not quite free from weeds.

Pinnaroo, June 14.

(Average annual rainfall, 16·74in.)

PRESENT.—Messrs. B. L. Harfield (chair), F. G. Bonnin, F. H., P. J., and R. Edwards, L. M. Ferguson, L. M. Hannaford, W. A. Kelly, H. Ledger, J. Letheby, M. McCabe, B. H.

Nash, C. A. E. Schiller, J. Scales, L. Small, T. B. Shiels, H. Venning, L. H. Wright, Geo. and Wm. Wilson, H. C. Whittle, P. H. Jones (Hon. Sec.), and four visitors.

FALLOWING.—The following paper was read by Mr. J. Scales:—"Since the opening up of the Pinnaroo district right up to the present time, returns have been obtained which, it is safe to say, have not been exceeded in any other mallee district in South Australia. This is all the more remarkable when one considers the inferior system of cultivation that has been generally adopted. But the time has now arrived when in order to farm successfully in this, as in nearly every district in this State, it is necessary that at least half the area sown each year should be fallowed. The advantages of fallowing are so well known to the majority of farmers that there is scarcely any need for me to mention them in this paper. The greatest benefit of all is the conservation of moisture. That being so, it is advisable to commence fallowing immediately after seeding, so that the winter rains are all taken into the ground and kept there by the cultivation later on. In this particular district June, July, and August are the best months in which to fallow. The ground is then usually in the best condition for a thorough ploughing. The seeds of any weeds that happen to be in the land will germinate, and an opportunity will be afforded of destroying these during the spring. No hard and fast rule can be laid down as to the proper depth to plough. While some paddocks or portions of paddocks can with advantage be ploughed to a depth of from 4in. to 5in., in other parts the soil will not permit of such deep working. For a time, at least, I consider it very unwise to bring too much clay to the surface at once; it will be found more beneficial to do so gradually, allowing it time to sweeten and mix with the top soil. The sand ridges, however, may be ploughed fairly deep, as one rarely secures a good stubble burn on these. A deep working will therefore not only conserve more moisture and sweeten the soil, but also root up and destroy a greater quantity of shoots and stumps, which will take a long time to destroy in any other way when the ploughing is completed. The land should be cross-harrowed. This is best done while the ground is moist; preferably after light rains. This will level the land for the cultivator, and also bring the stumps to the surface, so that they can be picked up more easily and burned or stacked, as the case may be. The best time for cultivating the fallow is from the middle of September to the end of October, and for this purpose I prefer the skim plough, as this implement not only destroys the weeds best, but also leaves the surface of the ground perfectly level, so that further working for this purpose is unnecessary. If, however, weeds are bad, it will pay to cultivate the fallow twice during the spring. The more the ground is worked, where the annual average rainfall does not exceed 16in., the better. It has the advantage both of keeping the land clean and conserving moisture, thereby enabling the farmer to apply a heavier dressing of superphosphate with safety. Where sheep are kept on the farm, less working is needed in order to keep weeds from seeding. These animals do not actually destroy weeds, they simply keep them in check, and prevent them going to seed. If time permits, farmers should work their fallows thoroughly. This is the safest means of producing clean and heavy crops of hay and wheat." Mr. P. J. Edwards indorsed the views as expressed by the writer. In a few years he would like to see all the area for the following season's crop fallowed. In consequence of the large paddocks in this district, he preferred to follow the plough with the harrows, and then cross harrow later. Mr. McCabe advocated less fallowing, and his idea was not to begin until the land had had four crops. Mr. H. Ledger realised the importance of fallowing, but his experience was that adjoining crops on fallow and stubble only returned a difference of 1 bush. per acre in favor of the former. He doubted, therefore, whether the return warranted the extra working. Rather than allow the land to be under fallow for a year he would put in a crop of oats. In further comment, Mr. P. J. Edwards mentioned that the return secured by him from stubble last year was 10 bush. per acre, whilst fallow under similar conditions yielded 20 bush. Mr. Roy Edwards explained that in the case under notice the ploughing was not completed until the end of September. Considerable difficulty was experienced in getting the land clear of oats once they were planted, and there was always the danger of this crop going down before it could be harvested. In reply, Mr. Scales said there would be much less risk of take-all if the fallowing was commenced early.

Sutherlands, June 14.

(Average annual rainfall, 10·60in.)

PRESENT.—Messrs. F. A. Snell (chair), Thiele, G. and J. H. Geyer, B. and H. Mibus, E. Twartz, Hensler, A. M. Twartz (Hon. Sec.), and one visitor.

CARE OF HARNESS.—The Hon. Secretary read a short paper, in which he advised the provision of suitable hooks in a closed shed to protect harness from the effects of the weather. Fowls should not be allowed to roost on it, and it should be dressed with neatsfoot oil twice a year. A gallon of oil would be found sufficient to treat the harness of 10 horses for two years. The extra wear that was secured fully warranted the trouble and expense involved. During March and September were the best times for oiling. It would also be found that boots would well repay a dressing of neatsfoot oil. Members agreed with the ideas of the writer of the paper. The practice of scrubbing the harness before oiling had been found a good one. The price of leather, it was thought, would tend to increase.

Walkerie, June 23.

(Average annual rainfall, 8'89in.)

PRESENT.—Messrs. F. G. Rogers (chair), C. Promnitz, A. Lewis, G. Jachmann, S. Modistach, C. Borroughs, J. Jones, F. B. Williams, J. J. Odgers (Hon. Sec.).

PRUNING SULTANAS.—Mr. F. G. Rogers described the manner in which he pruned the Sultana vine. He favored keeping the crown low and preventing it spreading, and selected canes with the internodes as short as possible. Rank growing canes, with thick wood and widely separated nodes should be cut right away. He spurred to two eyes, and selected three, four, or five rods of new canes, according to the strength of the vine. They were brought down to the bottom of the vine and given a good twist. Last year he had used up to six canes, with spurs in between. Generally water shoots, which came from the main vine (the old wood) were looked upon as being useless for fruit purposes, but in his experience these produced the best fruit.

Wilkawatt, June 14.

(Average annual rainfall, 16in. to 17in.)

PRESENT.—Messrs. D. F. Bowman (chair), W. J. and D. Bowman, J. A. and V. Ivett, E. W. and H. H. Brooker, A. J. McAvaney, F. and B. Spackman, W. R. and M. Neville, F. W. Altus, P. Maher, G. A. Altus, B. Tylor, W. J. Tylor (Hon. Sec.), and eight visitors.

PICKLING SEED WHEAT.—The following paper was read by Mr. H. H. Brooker :—“The object of pickling seed wheat is to prevent bunt or smut in the resulting crop. The minute particles which are contained in a ball of smut are the seeds or spores of a plant, just as the grains of wheat are seeds of the wheat plant. These spores have power to germinate, grow with, and live upon the material of the wheat plant, and thus cause a smutty crop. Therefore we aim at destroying the smut spores without injuring the vitality of the seed grain. It then follows that seed wheat so treated should result in a clean crop. If this be true, the question will naturally be asked as to why seed wheat which has been pickled not uncommonly yields a smutty crop. This can be explained by stating that it is the method of pickling which is at fault. None of the methods in use to-day is effective in destroying the spores which are contained in any unbroken bunt balls, and it is essential for efficient pickling that the bunt balls be either removed or smashed so that the pickle may come into contact with the spores. If the bunt balls are not broken or removed before the operation of drilling and other handling prior to drilling they are likely to become broken, and the still vital spores are spread over the pickled seed. We must bear in mind that pickling destroys only those spores adhering to a grain at the time of pickling, and does not render it immune to further contagion. The problem of efficient pickling, then, lies not so much in the choice of the fungicide, but in the mechanical means which we employ. The three chief methods of pickling are as follows :—(1) Immersing the bags of seed in the pickle for a few minutes and then pulling them out to drain; (2) spreading the grain on a floor or in a box and sprinkling the pickling solution over the seed and stirring the mass; (3) by pouring the grain down through the solution itself and catching it in a perforated yet wheat-proof vessel suspended in the solution. The first method is to be condemned, inasmuch as the pickle necessarily requires some time to percolate to the centre of the contents, and contact with every grain is not assured. Moreover, it allows of no agitation to the grain to break the smut balls; consequently they emerge from the pickle still capable of infecting the wheat. The second method is a considerable improvement on the first, as it affords a good opportunity for breaking the bunt balls in the stirring process. This method, however, is laborious and somewhat messy. The third method is most reasonable of all. Here, in

the downward pouring of the grain into the solution (if care is taken not to pour the grain too quickly) each receives its share of the pickle, and as smut balls are lighter than the solution, they float on the surface and can easily be skimmed off. The grain may be stirred as an extra precaution to insure the separation of any hant balls sunk by the downward rush of the grain. The vessel can then be hauled up, and the solution drains through the perforations." Members were divided in opinion as to the relative value of the different methods of pickling.

EDUCATING UNBROKEN HORSES.—Mr. P. Maher read the following paper on this subject:—"Curiosity is strong in every colt. Put a colt in a closed yard with nothing to draw his attention, then place an empty bag, rug, or cloth of any description in the centre. At first he will be very nervous, but as he finds that the bag does not move, he will snort, stretch his neck, and walk round it, gradually getting closer, until he can smell it and feel it with his nose. After once he recognises that it will not hurt him, he will take it in his teeth, paw at it, and play with it. Therefore, always remember he will not try to kick, or get away from anything of which he is not afraid. Avoid haste; patience is the keynote to success in horse education. It must be expected that he will resist anything he does not understand or thinks will do him an injury, so it is evident that we must teach him first that we will not injure him, and that harness will not hurt him. Let him examine every article before it is put upon him. Allow him to smell and feel it with his nose until he is no longer afraid. He can be educated and led quicker than he can be bullied and forced, and with better effect. Do not frighten him whilst getting him into the yard. Once in, keep away anything that will draw his attention from the trainer. A closed-in yard is better on this account. Stand in the centre of the yard. Do not move your body; bend your arm from the elbow straight in front of you; stand like this and let him examine you. He will come closer and closer, and stretch out his neck and smell your hand. After he has satisfied himself that you will not injure him, take a thin stick or whip handle; bring it in line behind him. It is a good plan to have a small piece of rag attached to the end. Then follow him around the yard, gradually working closer, until you place the stick gently on his back. Speak to him all the time in a gentle tone. Work the stick gently along his back, rubbing him lightly with it until you can rub his head, ears, and legs with it. When he stops walking and faces you, work your way towards his shoulder, still rubbing him, until you can put your hand on his neck, working it gradually to his head. Let him smell it as often as he feels inclined. Stroke his head, neck, and shoulders until he is perfectly at home with you, then proceed to halter him. Put a light rope around his neck. If he pulls back, do not resist, but keep a light strain on, all the time drawing his head towards you, until you can bring him to you with a light pull on the rope. This will take a considerable time, but it is time well spent. Do not attempt to tie him up until you have accomplished this. You should have no trouble to put on the halter. Always use a leather, not a rope, as it is stronger and more comfortable. When you have the halter on, pat him and give him a few heads of hay from your hand. If you have been patient, and have used no force, he will be quite reconciled by now. The time taken depends on the temper of the colt. With high-spirited animals that are very frightened it is much less than with dull, stubborn colts that are inclined to lay back their ears and kick. The former should be handled with care and patience. He will become docile in about three-quarters of an hour or so, but the latter may take anything up to four hours. It may be necessary to give a stubborn and vicious colt a few smart cuts with the whip right at the start. On no account enter into a pitched battle, as this will probably make him worse. When the halter is on, teach him to lead. To do this, stand a little to one side and draw gently on the halter rope. If he brings his head to you, pat him, and continue as before. If he resists, do not pull hard, keep a steady strain. Touch him gently from behind with a whip. Keep at this until you can draw his head in any direction. Remember he has no idea of his strength, therefore if you do not resist him, he will think he is compelled to follow you wherever you draw his head. When you have taught him to lead, lay down the rails and lead him past them two or three times before going into the open. He will then have no desire to rush out too fast. Lead him in all directions in the open, avoiding anything that will frighten him, such as dogs, pigs, or goats. It is best to be alone so that his attention is fixed on the one centre. After this you may take him back to the yard and put a bit in his mouth. I prefer a medium size one, covered with rubber, possessing large rings and no crossbars, which may be dangerous to man and horse. Allow him about two hours to chew and get used to the bit. Do not tie his head back, as this tends to make him resist and pull to get it free. This should be sufficient the first day with an unbroken colt. During the next day teach him to drive, using the reins alternately. Then put on both reins and let him walk round the yard, first one way and then the other. Guide him across the centre when you are able to do

so. If he is a bit at a loss at first, coax him along with a light whip. When he will guide well in the yard, exercise him well in the open, first at a walk, then at a trot, until he will guide in any direction with a pull on the reins. Take care not to break the skin with the bit, as this makes the mouth callous and results in a hard-mouthed horse. Give him a short rest, pat him, and feed a little fresh hay from your hand. Thus you are making him feel you are his friend, and he should no longer fear you. Stroke his front leg gently, starting at the shoulder, and working gradually down to the foot, pulling and stroking until you can lift it. Continue this until he will lift his foot when you catch hold of it without any trouble. Lift the foot, and strap it to the forearm of the same leg with a light breeching strap. As he gets used to it you can lengthen the time that he is kept in this position until you can lead and drive him about on three legs. You can with safety handle the most vicious colt when strapped in this manner. He can neither kick nor strike at you with much effect. Now proceed to saddle him. He will most likely be afraid of the saddle, so put it on the ground in front of him, let him examine it well, then hold it up to him and let him smell it before placing it on his back. When saddled, lead him about to get used to it. Then let down the leg and exercise by leading and driving. Let him rest for a time with the saddle on. Now strap up the leg again and gradually pull on the stirrup with more and more weight. Put your foot in the stirrup, raise yourself slightly from the ground, rising higher each time. Do not hop, but raise yourself easily until you can put your other leg over his back. All this must be done slowly, so that by the time you raise your leg over his back he will not be afraid. If you succeed in this, there will be no fear that he will buck. After mounting, get off and on from both sides, and slip down over his rump until he is not in the least afraid. Then you can ride him a few times around the yard before letting the leg go. If this is done with care there should not be any trouble in riding him out in the open. To educate for harness, procure a light brake or sulky. Place this close by while you harness up. Strap up his leg as before, allowing him to smell every piece of harness before putting it on. Exercise him with the leg tied up, then with it down. Take him to the sulky and let him study it. Lift up the shafts and move it along. The leg can now be strapped up, the sulky drawn up behind, and the harness buckled up. If he stands, get up and down several times, then start him by gently pushing him off the first few times. You need not get into the sulky, as he is unable to bolt or kick while standing on three legs. Drive him about for a short time until perfectly quiet, and then take off the strap, and he should be quiet enough to educate to the different modes of work. This is not an account in detail, but a rough outline practised by myself after studying different methods of handling young horses." Members agreed with the writer of the paper that the exercise of patience was an important factor in the education of young horses.

SOUTH AND HILLS DISTRICT.

Blackwood, June 10.

(Average annual rainfall, 27in. to 29in.)

PRESENT.—Messrs. W. L. Summers (chair), Ashby, P. H. Williams, W. Gamble, T. C. A. Magarey, Carlos, Wilson, Eglinton, Scherer, Penno, Nicolle, L. Sullivan, Fennell, Porter, G. W. Summers, Hilfers, Savage (Hon. Sec.), and one visitor.

QUESTION BOX.—The meeting took the nature of a question evening, a number of subjects of interest being dealt with. *The Moon and Vegetables.*—In reply to a query as to whether there was any difference in the growth of vegetables planted with the new or full moon, it was pointed out that there was a belief among the ancients that the moon affected both the weather and plants. In some parts of Germany peasants would not sow annual vegetables at the time of a waning moon, the best results being obtained by sowing between the new and the full moon. On the other hand some moon theorists advised against sowing except in the last quarter of the moon. Scientists who had endeavored to record any variation due to these causes asserted that the phases of the moon had no effect on the crop. *Local Cool Store for Fruit.*—Replying to the question as to whether it would be advisable to erect public cool storage accommodation for this fruit-growing district, the Chairman said that the time was hardly ripe yet, but when the orchards now planted came into bearing it would be profitable to have cool storage here. This was a question which might well be considered in connection with Mr. Laffer's recommendation to establish co-operative fruit-packing sheds in fruit districts. Before any steps

were taken in this direction the Branches at Cherry Gardens, Clarendon, and Upper Sturt should be invited to co-operate. *Green Manuring.*—A member asked, "Is it necessary to plough under green crops between fruit trees to keep up the humus of the soil? Which is the best crop to sow, when should it be sown, and what is the best time to plough it under?" Mr. A. W. Magarey replied that if the soil was deficient in nitrogen and humus it would benefit greatly by having a crop ploughed in. Those that needed green manuring were light sandy and heavy clay soils. The sandy soils were very deficient in humus and nitrogen, and in clay soils green manuring largely improved the mechanical nature of the land. The plants having been ploughed in rotted, and vegetable and carbonic acids were produced. These, acting on the soil, assisted in its decomposition and the liberation of plant foods. A crop ploughed in added about 100lbs. of nitrogen, equal to 4cwt. sulphate of ammonia or 8cwt. of dried blood per acre. The best crops for green manuring were quick-growing leguminous plants. For this district cow peas were as good as any. They should be planted as soon as rain permitted, and ploughed under just before the crop reached maturity. Members were of the opinion that cow peas were not suitable for this district, but that better results would be obtained from peas or berseem. *Afforestation.*—The question of afforestation was dealt with by Mr. Ashby, who pointed out that many of our steep hillsides could be advantageously planted as forests. In 30 years these would return a far greater profit than if the land had been used for grazing. Members were advised to support the planting of forest trees, and if they themselves could plant a few acres it would materially benefit the country. *Subsoiling Orchard Land.*—"Is it advisable to subsoil land before planting an orchard, and what are the best methods of doing it? Is root-pruning advisable?" The Horticultural Instructor replied as follows:—"(1) Subsoiling—I am of the opinion that in all but deep, loose gravelly soils, breaking the subsoil is desirable before planting fruit trees. The method must largely be decided by the circumstances. If the soil is too steep for teams to work, hand-breaking by means of grubbers—the two-pronged pick for preference—must be resorted to, pulling the soil downhill. Where bullocks are available they will work on steeper and wetter land than horses, and moreover are safer to handle and more economical of tackle. On wet hillsides where there is very little stone in continuous veins in the land, I prefer bullocks attached to a stump-jumping or even fixed hillside disc plough. On soils more consolidated two teams are desirable, the first attached to a strong all-steel plough, opening a wide furrow, say 10in. to 14in., to as great a depth as possible, and another strong team following in that furrow pulling a simple subsoiling plough. This method leaves ridges in the subsoil, but these are not serious obstacles to the roots. If time and means permit, a cross subsoiling even less carefully done will break these ridges. For this latter type of work, when the subsoil is just moistened in early winter or before it dries out too much in early spring usually prove the best times, as the surface is not too slippery to afford good foothold to the draught animals. The proper subsoil plough is preferable to an ordinary plough from which the mouldboard has been removed, as its draught is lighter. The imported American types with the gooseneck beam cost about £5, but they should be made locally for half this amount. In practice, a bullock chain should be fixed around this beam just above where the neck starts to curve, and be passed through the bridle so that the strain of the draught does not come upon the front of the beam, which, under such tension, is liable to bend or straighten out. The depth the soil should be broken is in most cases as deep as the owner can afford, but certainly not less than 12in., and 18in. is much better if it can be accomplished. In respect to the use of explosives, though not a new process, it is as yet in the experimental stage. In rocky subsoils or those the peculiar structure of which causes them to become consolidated by the action of moisture and evaporation, doubtless the use of a plug of gelignite or other explosive in the position where each tree is to be set would facilitate root penetration, but whether it would pay I am unable to advise. As far as I can ascertain from private orchardists and our own experience, ordinary subsoiling by hand or team work in this State costs anywhere between £4 to £16 per acre. (2) Root Pruning—This operation has never become a practice in Australian fruit culture. Under most conditions of growth in this State trees can be brought to bear sufficiently early by other practices, such as avoiding pruning, or at any rate heavy winter cutting, or by allowing the soil to dry out early in summer. In wet districts, however, I am of the opinion it could be used to advantage in bringing rank-growing non-fruiting specimens of trees into bearing, as it is the most heroic method of restricting constant vigor of vegetation, which is incompatible with fruit production. The method of application consists of opening a trench around the tree during the dormant season, making a radius of 3ft. to 5ft. from the stem, and cutting the strong roots which tend to descend vertically or obliquely, preserving as far as possible the more slender and horizontal ones. The trench should be filled in with good soil,

and if fairly decomposed stable manure or bonedust be available, a small quantity should be mixed into the returned soil to encourage the formation of fibrous roots." Mr. Ashby stated that he had been doing a great amount of subsoiling with explosives, but to do work equal to that of the subsoil ploughs in our land, the cost would be five times as much with explosives as with the ordinary team work. The soil should be disturbed for a radius of 10ft. to 12ft. around each explosion, but he found in his land with the stiff clay subsoil the effect did not extend more than 2ft. or 3ft. "Is it advisable to grow root crops between fruit trees?" Mr. Quinn replied—"Experience tends to show that in positions where the soil is good and moisture abundant the growing of root crops which are systematically tilled and manured in strips between the rows will not injure fruit trees during their earlier years of growth. It is more largely a question of moisture than fertility. Cereal crops should not under average conditions be planted, excepting, perhaps, in a very narrow strip down the centre between rows."

POTATOES.—Questions relating to the planting of potatoes, *i.e.* (1) the distance to be observed between the seeds when planting; (2) the depth to which they should be planted; (3) the size of the sets used; (4) the system of manuring adopted; (5) the most profitable kinds to grow; (6) the systems of cultivation followed; and (7) the method of handling the seed, were submitted to Messrs. Joseph Johnson, of Uraidla, (Curtis (Piccadilly), and Pope Bros. Mount Barker) by the Chairman, who received replies as given below.

Distance between Seed.—How far apart do you advise planting? Mr. Curtis—Under irrigation Snowflakes should be 15in. apart, with 2ft. between the rows. A little less will do for Pinkeyes and Up-to-Dates. Messrs. Pope Bros.—The sets of early varieties planted early should be 15in. apart, in rows 22in. to 24in. from each other. Early sorts produce nearer the stalk and less than the main crop. Later planting should be 24in. by 18in., and Snowflakes at Christmas require to be 20in. by 30in. Mr. Johnson—Pinkeyes, Up-to-Dates, Bismarks, and others which make the same growth can be planted 22in. or 24in. by 12in.; but it will pay to give Snowflakes, Prolifics, and Excelsiors more room, especially in rich soil.

Depth of Planting.—How deep do you recommend planting? Mr. Curtis—In winter, place the seed as shallow as possible, and hill; in the summer, from 3in. to 4in. is best. Messrs. Pope Brothers—If the ground is wet plant near the surface, otherwise from 4in. to 5in. deep. Mr. Johnson—Sets planted in the winter months should not be more than 3in. deep. In spring an inch deeper is desirable. I would rather plant shallow than deep. The best potatoes are always found near the surface. Deep planting is often the cause of irregular crops.

Size of Sets.—Do you prefer whole or cut seed, and what size should the sets be? Messrs. Pope Brothers—Nice-sized (not too small), round seed is the most profitable, but be sure to buy from growers who plant large seed. Do not plant large seed whole, because although the resultant crop may be larger it will not pay for the extra cost involved. When the seed has been sprouted, one strong eye is better than half a dozen weak ones. Two or three eyes are quite sufficient. Mr. Johnson—Cut sets usually give the best results for first planting. The size of the sets depends on the number of eyes on the potato. I prefer a 2in. set. Two eyes are ample. One eye of some varieties, if well "shot," is quite sufficient. Pinkeyes and Up-to-Dates will produce good results from one eye. These two have fewer eyes than others.

Manuring.—What kinds of manure do you favor, and in what quantities should they be applied? Mr. Curtis—Use bonedust or bone super., with a little nitrogen and potash, at the rate of about 20cwts. per acre, in the absence of stable manure; 12cwts. with a light dressing of stable manure and 5cwts. with a heavy dressing. Messrs. Pope Brothers—We got the best results by applying 6cwts. per acre of equal parts of bonedust and mineral super., well mixed and worked into the ground before planting. Do not sow the manure in the rows with the sets. Mr. Johnson—Decayed stable manure adds to the land in most cases that which the potato requires. I have had splendid results from Government bone manure and chemical potato manure. The quantity depends upon the quality of the soil—if it is in good heart, use 8cwts. or 10cwts., if not, apply up to 20cwts.; it will pay well—and the crop it has carried immediately before. Some crops, such as peas, vetches, beans, and cabbages, enrich the soil, and add to it that which the potato needs, whereas others take it out.

Most Profitable Kinds.—What do you consider to be the most profitable kinds of potatoes to grow? Messrs. Pope Brothers—For September-October, Carmen No. 1, Brownett's Beauty, and Excelsior (Redskin) do best with us, and are suitable for heavy ground and for raising under irrigation. For late planting, Snowflakes do well in sandy soil. Mr. Johnson—Pinkeyes, Carmens, Up-to-Date, and Excelsiors are the best for the first, and Snowflakes and White Prolifics for the late planting. Prolifics are the most blight resistant. When a quantity is being grown Pinkeyes and Excelsiors are the most profitable. Carmens and Up-to-Dates stand highest in respect to quality.

Cultivation.—All

three growers particularly emphasized the necessity for thorough preparation of the soil before planting. Faulty and inefficient cultivation was admittedly one of the main factors in poor yields. Deep and frequent working before planting was essential to secure the best results. *Handling the Seed.*—Mr. Johnson laid stress on the importance of carefully handling potatoes intended for seed purposes, and advocated sprouting in trays. He recommended keeping the potatoes in racks or cases in a well-ventilated shed, or even in the open, provided protection against the weather was afforded. The cases in which galvanized iron was imported made splendid trays. The bottom boards should be knocked off and sufficient replaced to allow of free passage of the air between them. Cases 6ft. or 7ft. long would hold about a bag of potatoes. Banana cases also made satisfactory receptacles for storing seed. It was necessary, however, to nail cleats on the top of each, so that when stood one above the other there would be plenty of ventilation. Stored in the manner indicated seed potatoes could be kept in good order for six months, or even longer. By planting seed with good, even sprouts, a quicker and more even growth was secured, and the crop was better. When taking the seed out into the field, boxes and not bags should be used, otherwise the best shoots might be knocked off. Very heavy yields could be obtained if the crop was given a fair chance. When planted 2ft. by 1ft., an average return of only 11lb. for each plant was equivalent to 8 tons per acre, while 2lbs. was equal to 16 tons, which was often secured with proper treatment under irrigation.

Cherry Gardens, June 17.

(Average annual rainfall, 35.03in.)

PRESENT.—H. Jacobs (chair), J. Lewis, C. Lewis, G. Hicks, T. Jacobs, sen., A. Broadbent, J. Tozer, S. W. Chapman, T. Jacobs, jun., H. Lewis, and A. R. Stone (Hon. Sec.).

HANDLING YOUNG HORNED CATTLE.—Mr. Thos. Jacobs, sen., initiated a discussion on this subject. First, dealing with the young steer, station bred, he said, after yarding it if possible with old bullocks it was often necessary to rope the beast. It should then be yoked to a quiet worker and turned into a yard for awhile. This would generally be found sufficient to quieten it, after which it could be placed in the body of the team, care being taken not to overburden it. Farm-bred steers were generally more quiet, and it was not necessary to rope them. With this exception, the same treatment was advised. Young heifers near to the time of calving should be seen at least once a day. Assistance should be rendered where necessary, every care being taken not to unduly excite them. The calves should not be allowed to suck. The cow should be provided with a moderate supply of good green fodder. She should be taught to bail when first being milked, and this might involve a great deal of patience on the part of the milker. The teats should be handled carefully. If the udder was swollen, it should be bathed with tepid water. A legrope should not be used unless absolutely necessary, as the use of this frequently resulted in the animal becoming a permanent kicker. Because she was not giving much milk she should not be dried off quickly, as it was probable the same thing would occur at future calvings. Three years was a good age for the heifer to calve. Mr. H. Jacobs would use the bail as well as the legrope when cows affected with sore teats had to be milked. Mr. C. Lewis opposed the use of the legrope as unnecessary; milking without bails was also advised. Generally members agreed with the ideas expressed by Mr. Jacobs.

Clarendon, June 16.

(Average annual rainfall, 33.67in.)

PRESENT.—Messrs. A. L. Morphet (chair), H. C. Harper, J. Potter, J. R. Nicolle, W. B. Burpee, H. Rowley, L. Masters, A. A. Harper, T. B. Brooks, A. Phelps (Hon. Sec.), and one visitor.

CARE OF HORSES.—Mr. A. A. Harper read a paper. It was a bad practice, he said, to turn horses into paddocks where there was insufficient shelter. When they were working they should be provided with a warm, clean stable, with plenty of bedding. A sufficiency of good feed was necessary. They should be watered four times a day, preferably before feeding. When working, the animals should be groomed twice a day. Mr. Potter did not think it necessary to give them water four times daily, but the Hon. Secretary advocated placing a trough handy to the stables in order that they might drink as they felt disposed.

SEED POTATOES.—Mr. Potter had kept a quantity of seed potatoes from last year; some were stored in a room, and the balance heaped in a paddock and covered with the tops. The former went soft and shrivelled, whilst the latter remained solid until the time of planting.

Forest Range, June 19.

(Average annual rainfall, 35in. to 36in.)

PRESENT.—Messrs. J. Green (chair), W. McLaren, E. and F. Rowley, J. Vickers, O. Pollard, F. and A. Green, H. Sass, C. Dollman, G. Brockhoff, H. Schultz, E. Green (Hon. Sec.), and two visitors.

FRUIT-PACKING UNION FOR THIS DISTRICT.—The following paper was read by Mr. F. Green:—"As several papers have already been written and discussed on co-operation, it is needless for me to enlarge on those principles, as they are generally accepted by this Branch, the discussions on those already written proving this beyond all doubt. My purpose, therefore, is to apply these principles to a distinct line of production in which we are all interested to a greater or lesser degree, viz., the apple export trade. Some few years ago South Australia had the name of shipping the best fruit from this side of the world, and could always command a higher price in the English and Continental markets than fruit from our sister States. Unfortunately that does not now obtain. We have lost our good name for the State's fruit as a whole simply through our own fault, and this is directly the result of shipping immature and worthless fruit. I have seen better fruit sold to the street barrow men at 1s. per case than some I have seen packed for export. Under these circumstances can it be wondered that our good name has left us? But this is not all. I have before me as I write a market report from Lütten & Sohn, fruit salesmen of Hamburg, relative to the first cargo of apples arriving at Hamburg this season, and it affords room for serious consideration. The report says, 'On the whole the apples showed up far too green and immature, with the exception of a few parcels—mostly Gravensteins, and some Jonathans and Cleopatras.' On glancing down the list of prices I find these varieties quoted—Gravensteins, Emperor, Jonathans, Reinettes, Cleopatras, Munroe's Favorites or Dunn's Seedling, London Pippin, Bismarck, and Rome Beauty. This shipment left Adelaide somewhere about the 18th February. I was a little surprised to find no mention of Rokewoods among them. And we wonder why low prices are received and our name for good fruit has gone down. Although I considered we have lost our name as a State beyond recall, I am strongly of opinion that we could work up a name for a certain brand to what our reputation used to be, and it is in this respect I wish to advocate the claims of a packing union. Individually we are too small and weak to make our presence felt in oversea markets, but collectively we can place parcels that will command attention and interest. In this connection we should use two brands, and ship only the best and choicest fruit under our first brand. It should be our aim to keep this brand to the highest degree of excellence, and not sacrifice it for the sake of a few extra cases. Under our second brand we would ship those varieties that are not so favorably received, and fruit of the first brand varieties that are not up to our standard. Above all, we should see that our fruit is sufficiently mature. Another advantage to be gained by co-operation would be in the matter of supplies for packing purposes, i.e., wrapping paper and boxes, rail transit, &c. By being able to order in one large lot we can make considerable savings, a matter in which I will give practical proof later on. Another point to be considered is the saving of labor and worry to each individual grower in the midst of his fruit-picking season. At present growers use the daylight hours for picking, and very often candle light is used for packing, which is a mistake in two ways. First, the very best light is needed for packing purposes, and second, a man can do quite enough work in daylight hours without putting in evenings as well. Under a co-operative system a grower would pick, carefully sort and grade his fruit, take it into the packing shed, and his worry would be done. Again, in short-crop years hardly any individual grower has enough fruit to bother about export, but with co-operation we should still be able to make some shipments, for where one grower would not have enough of one variety to bother about, 10 growers with only 10 cases each make a nice parcel of 100 cases, and in this way our name could be kept before the buyers year by year, instead of all one year and none the next, as is the case at present. Another feature would be the regulating of the marks, varieties, and grades by combination against individual effort. In this connection I would point out that no two growers have exactly the same ideas in marking and grading. In this respect I would suggest a uniform system be adopted and rigidly adhered to. Personally I favor the grade being marked according to the size of the fruit, i.e., 2½in., 2¼in., and so on. I might mention that one firm of

careful growers are so exact in this respect that the signs are marked to an eighth, that is, $2\frac{1}{8}$, $2\frac{2}{8}$, $2\frac{3}{8}$, and so on; and if it were not an advantage I do not suppose they would do it. Whether we need be so exact as that is a question I am not prepared to decide, but we should be particular to see that a case marked $2\frac{3}{8}$ in. should contain fruit of that size, not smaller or larger. Our marks should be depended on, and should be a fair criterion of what the case contains. Co-operation should enable us to offer large parcels of one variety, and in the thickest of the season our largest shipments should not contain more than two or three varieties. As an example: If, as a union, we were to ship 500 cases by one steamer, between us that quantity could be made up of at the outside three varieties, and three grades to each variety—total grades, 9. The same quantity of fruit shipped individually would be in 25, 50, or 100 case lots; taking 50 as the average, 10 growers' marks would be needed. Then in a good many instances several varieties would be included in each 50. What a multiplicity of unneeded marks we have, and what confusion it must cause at the other end. We may not see the direct pecuniary advantage to us immediately, but I am convinced that the profitable export of fruit in the future can only be carried on in this way. It is impossible to go into a matter of this description in a paper of this kind. There is such a multitude of minor details to be settled that I feel that the proper place to definitely deal with them is in a committee of growers themselves, when all these details can be worked out and finally settled. There need be no apprehension in regard to working such a scheme; other places have successfully worked them under greater difficulties than those that face us. One thing needful is absolute loyalty among the members. I wish to make one observation in regard to papers written before the Bureau, and that is the notable absence of any direct movement arising out of the paper. We discuss it, generally agree with it, and go home and forget about it. Result, nothing done. Now, I submit this is too important a matter to drop in this manner, so I take the opportunity of moving a motion to the following effect, 'That in the opinion of this meeting it is desirable to form a fruit/packers union for the purpose of combined export of apples and other branches of products as occasion arises,' and in the event of this motion being carried I intend to move, 'That a committee of interested growers be appointed to work out and formulate a scheme for the working of such a union.' The motion was seconded by Mr. W. E. Rowley, who said that unless growers would co-operate the export trade was doomed. It was then put to the vote, and carried unanimously, and a committee was appointed to formulate a scheme for adoption.

Ironbank, June 14.

(Average annual rainfall, 33in. to 34in.)

PRESENT.—Messrs. C. Morgan (chair), W. Dalton, P. Coats, W. Slater, W. Coats (Hon. Sec.), and two visitors.

FRUIT SHED.—Mr. Leo. Coats described the method of erecting a shed for the packing and storing of fruit. The walls should not be less than 2in. thick, and the distance between floor and ceiling 9ft. The roof should be sufficiently high to provide for a loft between it and the ceiling.

Longwood, June 14.

(Average annual rainfall, 37in. to 38in.)

PRESENT.—Messrs. W. H. Hughes, A. F. Furniss, J. Roebuck, J. Brown, J. C. Blakley, E. Colbey, E. A. Glyde, G. W. Doley, J. R. Coles (Hon. Sec.), and three visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. W. H. Hughes. Inspection of pines and wattles in a plantation attached to the homestead revealed that they were looking healthy. The three day's frost experienced during the previous week, reported to be the severest for 50 years, whilst doing considerable damage to wattles in low-lying districts, had not affected the trees here.

ANNUAL REPORT.—In presenting the annual report of the work of the Branch, the Hon. Secretary mentioned that the tendency of gardening in the district was in the direction of specialisation. The area under fruit trees had not been greatly increased during the year, but much old stock was being reworked with up-to-date varieties. The most favored apples were Rome Beauties, Jonathan, and Five Crown Pippins. The planting of plums was also receiving attention. The year was marked by an unusually small crop of apples, and the prevalence of codlin moth. A fair crop of pears was secured. Twelve homestead meetings had been held, and members visited the Coromandel Valley

Orchard, Mylor Type Orchard, Conferences of Hills Branches, and the inaugural meeting of the Blackwood Branch. Discussion of a conversational nature, relating to the early history of the Branch, the first meeting of which was held at Aldgate Valley in June, 1892, followed. Members were greatly impressed with the value of homestead meetings.

MacGillivray, May 20.

(Average annual rainfall, 19in. to 20in.)

PRESENT.—Messrs. P. Wheaton (chair), H. Ayris, A. J. Nicholls, H. E. Petras, A. Stirling, sen., and H. C. Williams (Hon. Sec.), and one visitor.

FARMYARD MANURE.—This subject was dealt with in the following paper by the Chairman:—"Now that the use of phosphates has become general in South Australia, every year more attention is being given to the other two essential elements which are generally deficient in the soil, namely, nitrogen and potash, for if not applied directly as manure every care is taken to keep the land in good heart by increasing the available supply of these by the feeding off of fodder crops, the growing of leguminous crops, &c. It behoves the farmer to take more care of the farmyard manure, and to use it to best advantage. Artificial manures generally only supply one of the three elements, while farmyard manure is a complete manure for any crop. Besides these elements it increases the organic matter, which improves the mechanical condition of the soil and raises the fertility. Farmyard manure will open clay soil and enable it to retain more moisture, while it has a binding effect on sandy soils. Its composition varies, but an average has been set down at .47 to .64 per cent. nitrogen, .30 to .44 per cent. phosphoric acid, P_2O_5 , .49 to .55 per cent. K_2O , which, taking the lower figures, is equal to 10lbs. nitrogen, 6lbs. P_2O_5 , and 11lbs. K_2O . These, if bought in Adelaide at present, would cost 7½d., 2½d., and 2½d. per pound respectively, making the value of the manure, if handled properly, 9s. 9d. a ton. The bulk of the nitrogen and potash is found in the urine and the phosphoric acid in solid excreta. Nitrogen, the most valuable part of the manure, is difficult to obtain, for unless voided in the field where the ground absorbs it the urine is attacked by germs in the litter, and according to the temperature is decomposed more or less rapidly into ammonium carbonate, which in contact with air soon associates into carbonic acid gas and ammonia, and the latter, containing the nitrogen, escaping into the air. There are objections to using farmyard manure. It takes time to spread, makes the land dirty, and the crop rank and patchy, but the results should be well worth the time taken as a dressing of manure will improve the land for several seasons. Its tendency to make the land dirty can be overcome by allowing it to rot thoroughly. For this purpose either a cement pit or two floors on either side of a urine pit, so that the liquid manure from these floors can drain into it, are necessary; but the best results are obtained from the stacks. The manure is placed on one floor and stacked up squarely; every time more manure is carted it is spread evenly over the whole of stack. The liquid manure is pumped over the heap every day to prevent it getting too dry. The heap should be kept trodden firm to exclude the air so that fermentation can proceed, this taking about six months. When one heap is built to the required height the other floor is used. The stables should be in a position that will admit of the liquid being drained to the urine pit. As every farmer has not a good floor and drains for his stable, the best results are to be obtained by using the manure fresh from the stable. The horses in this district are generally not stabled continually, except, say, from April till July. This time of the year is also cool and damp, and there is not the loss of nitrogen that there is in a hot, dry climate. The manure should be carted and spread at once evenly over the paddock, for it is when manure is put into heaps and left for months that the crop following is uneven. A strip should be taken through the paddock so that it can be ploughed in at the first opportunity. The excuse that the manure results in the crop being rank only applies to cereals, and we can use it for crops with which rank growth is desired. Every farmer can grow an acre or more of potatoes, and these give best results when farmyard manure is used. The garden will take a fair amount. There are summer crops that can be manured to advantage—maize, peas, pumpkins, &c. For irrigated crops it is very valuable in that rank growth is required, and the organic matter reduces the amount of water necessary. If manure is not wanted for these, a small paddock can be manured and ploughed ready for growing early green feed, which will mean a big save at the haystack, as the last two seasons have shown there has been sufficient light rain to keep green feed growing well if the ground has been prepared, but not sufficient for good early growth if land had to be prepared after rains early in the year. If the manure is ploughed in and allowed to lie,

a good crop of weeds will come up, which can again be ploughed in before a crop is sown." The value of this class of manure was recognised by members. The cost of handling was the principal objection to its utilisation. The humus provided by "long" manure was particularly desirable in intense cultivation practices. Where artificial manures were substituted, green manuring generally became necessary in order to maintain the supply of humus. Probably the best thing to do on the ordinary farm was to have a small paddock near the homestead and stables. The manure might be all used on this compact area for the raising of root crops, such as potatoes, and for various gross feeding fodder crops, such as maize and sorghum. One member had found, after applying stable manure to a small garden patch, that sorrel and other weeds just about took possession. This emphasized the necessity for only using well rotted manure.

Meadows, June 16.

(Average annual rainfall, 35.52in.)

PRESENT.—Messrs. G. Ellis (chair), T. B. Brooks, J. Catt, B. Usher, J. Morris, W. Nicolle, W. J. Stone, F. W. Vickery, E. W. Vickery, J. Stone, S. Smith, A. J. Ellis, H. Thorn, W. Edmonds, W. H. Bertram (Hon. Sec.), and one visitor.

HAY AND PEA CROPS.—Mr. B. Usher read a paper. In this locality, where they were not dependent on early rains to start their crops, he said, the grain should only be buried sufficiently to protect it from birds, &c. As a rule hay was sown on land previously ploughed deeply and cropped with peas; consequently, it contained a sufficiency of moisture, provided the surface had been properly worked. It was advisable to plough ground for peas to a depth of at least 5in. or 6in., irrespective of whether clay was being turned up. For hay he would sow Algerian oats mixed with Marshall's No. 3, Yandilla King, or White Tuscan wheats, in the proportion of two or two and a half to one. Seeding should be at the rate of 2bush. per acre. Guano super, at the rate of 1cwt. per acre could be applied. The manurial dressing for peas should consist of bonedust, with or without the addition of guano super. The former was very suitable for this district, as in his opinion it did not leach so readily as other manures. From 2½bush. to 2½bush. of peas should be sown to the acre, and if a dry spring and early summer were experienced, a thicker sowing would provide better returns. Deep sowing of peas and wheat for late hay crops was likely to result in the seed rotting. The Chairman had secured good results from peas manured with guano super, last year. Mr. Morris favored bonedust. By ploughing slightly deeper each year, a change of soil near the surface was secured. He buried the seed to a depth of 2in. Last year he sowed oats and wheat mixed, and the oats outgrew the wheat. This year he sowed the crops separately, and intended mixing the hay in the sheaves. Poor ground required a thicker sowing. Mr. L. Smith favored shallow ploughing.



Meningie, June 21.

(Average annual rainfall, 18.87in.)

PRESENT.—Messrs. W. Minchan (chair), A. Ayres, F. W. Newson, R. M. Scott, W. Tregilgas, W. M. Wright (Hon. Sec.), and one visitor.

THE SOIL.—The Hon. Secretary read a paper, in which he described the different nature of various soils. Whilst some contained plant food in abundance, others were lacking in this respect. The paper, continuing, read—"Most soils have been formed by the wearing away of rocks. Air, water, frost, and heat are the agents that are ever at work powdering these into loose particles. If a bright blade is exposed on a dewy night, the following day several spots of rust will appear on it. The oxygen of the air or water has combined with the iron or steel and formed oxide of iron. When this is brushed away, little hollows are left in the blade. In like manner the rocks are being crumbled. Then again the rise and fall of the temperature causes them to expand and contract, and so cracks are made. The moisture enters these, freezes, and by expansion widens the crack and allows the oxygen to carry on its erosive work. In this way a soil is formed from the hard granite rock, which contains potash, soda, lime, iron, phosphoric acid, and a few other substances, all of which form plant food. Running water also plays its part in disintegration. As the stones are rolled down by flood waters they file away the river bed and wear themselves into round boulders. Plants also assist in soil-making, for the acid from the sap of the roots eats away the rocks in order to supply the needs of the plant, while mushrooms will force their way through a macademized road. The subsoil is usually lighter in color and more solid than the surface, and in many cases, on well-worked farm land, forms an impervious pan, rendering the surface soil very sloppy after a rain. Special ploughs are now made for loosening the subsoil and thus breaking this pan. Humus is very dark in color, and is formed by the decay of plants and animals.

The decaying plants give off ammonia, carbonic acid, and other substances which go to make the soil very fit for the production of heavy crops. Mr. Livingston tells of the rich humus soils of Canada that have been formed by the decay of prairie grasses for countless centuries as being amongst the most productive land in the world. The black earth country in the south-east of Russia is another example of very rich humus soil, which will produce two crops in a single season. Boggy or peaty soil also contains much organic matter, or humus, and perhaps is about the only soil that is not formed by the decay of rocks. Organic soil is formed from the decay of plant and animal life, while the inorganic is formed from the decomposition of rock on the crust of the earth. The former soil consists chiefly of carbon, oxygen, nitrogen, and hydrogen, while the latter is a mixture of lime, sand, and clay. The organic soil such as humus may be tested in the following way. Take a pound of peaty soil on a shovel and place it on a fire, and in time all the organic matter will disappear. What is left in the shape of sand, clay, or lime can be weighed, and the shortage will represent the amount of humus contained in the original pound of soil. Inorganic soil can be roughly tested by putting a pound of it in a bucket of hot water and stirring thoroughly. Pour off the muddy water into another vessel, and allow both vessels to stand till all the sand in one and the clay in the other have settled to the bottom. Pour off the water, allow the contents of each vessel to thoroughly dry, and then weigh each separately. Soils are classified according to the quantities of sand, clay, lime, or organic matter which they contain. Sandy soil contains of sand more than three-quarters of its weight, while soil which contains more than three-quarters of its weight of clay is termed a clay soil. When soil contains about equal quantities of sand and clay it is known as loam; if sand predominates, sandy loam; but where clay predominates, clay loam. Marl contains nearly a quarter of its weight of lime, and if the remainder be sand, the soil is known as sandy marl; but if clay takes the place of sand, it is termed clay marl. When a soil contains more than a quarter of its weight of lime it becomes a calcareous soil. Peaty soils contain 25 per cent. or more of humus, or vegetable matter. The term 'light' and 'heavy' as applied to soils do not refer to the weight, but to whether they are easy or hard to work. The particles of sand allow an implement to pass easily between them, while the particles of clay stick closely together, making the work more difficult. The clay soil is therefore called a heavy soil, and the sandy soil is termed a light soil. There is a difference in the temperature of soils. Sand absorbs heat more readily than clay or peat, and consequently is warmer. Again, sand gives up its moisture much more readily than clay, by allowing the moisture to pass more easily through it. Dark soils absorb more heat than light; hence peat is warmer than chalky soil. It is essential that land should have a good subsoil, that is to say, the subsoil should be of such a nature that it will retain the moisture sufficiently during dry spells and at the same time allow of sufficient percolation to prevent stagnation. A clay subsoil is considered a good one in a dry country like Australia, but in a country where there is much rain sand or a sandy loam would be better, and obviate an expensive system of drainage, such as is carried on in the South-Eastern portion of this State and the hilly districts of the Mount Lofty Ranges." Mr. Tregilgas was of the opinion that sand retained moisture longer than clay.

Morphett Vale, June 19.

(Average annual rainfall, 23·32in.)

PRESENT.—Messrs. A. C. Pocock (chair), H. V. Sprigg, J. and E. Perry, F. Rosenberg, T. Higgins, A. Connole, W. Goldsmith, L. F. Christie, T. and A. Anderson, F. W. Crittendon, Dr. Newland, and E. E. Hunt (Hon. Sec.).

ROLLING CROPS.—In reply to a question as to the best time at which to roll a crop during dry seasons such as the present, members stated that where there was a little moisture in the ground at the time of seeding it was best to roll immediately after drilling. The result would be a quicker germination and the retention of more moisture.

Mount Pleasant, June 13.

(Average annual rainfall, 26·87in.)

PRESENT.—Messrs. H. A. Giles (chair), P. Miller, F. Langford, V. Tappscott, T. C. Phillis, D. C. Maxwell (Hon. Sec.).

ANNUAL MEETING.—After reading the annual report, which was adopted, Mr. Maxwell contributed a paper dealing with mistakes made and lessons learned. (See page 1352 of this issue.) Mr. Giles, in discussing the paper, considered that peas could be more generally grown in this district. Mr. Miller thought this crop could not be profitably grown on the Murray Flats, and in the hills immediately adjoining.

STOCK AND CROPS.—It was reported that stock were doing well, but were feeling the effects of the cold weather considerably. The absence of rain has considerably retarded seeding operations.

Narrung, June 14.]

(Average annual rainfall, 17in. to 18in.)

PRESENT.—Thacker (chair), Bottrill, Hacket, Bowyer, Critchley, J. and F. McNicol, Metcalf, Scott, Morgan, Rumbelow, Powell, Barker, Bennett, Richards, Mann, E. L. and G. R. Goode (Hon. Sec.).

SOIL FERTILITY.—Mr. C. H. Metcalf, a visitor, read a lengthy paper on this subject and illustrated his remarks by blackboard work. He dealt with the physical texture, the choice of crops suited to certain soils, soil moisture, humus, tillage, &c.

Strathalbyn May 27.

(Average annual rainfall, 19'28in.)

PRESENT.—Messrs. Cockburn (chair), E. Hall, T. Collett, W. Watt, H. T. Moore, W. J. Springbett, J. R. Rankine (Hon. Sec.).

SORGHUM.—Mr. Cockburn and Mr. Springbett had both grown sorghum during the past season, and spoke highly of it in comparison with maize for feeding to horses, cattle, pigs, &c. The former preferred Amber Cane variety, whilst the latter liked Sorghum Saccharatum. The Amber Cane variety was sown through the ordinary drill, sufficient hoes being closed to make the width of the rows 3ft., the distribution being at the rate of lbs. of seed to the acre.

Uraidla and Summertown, June 2.

(Average annual rainfall, 44'35in.)

PRESENT.—Messrs. H. F. Johnson (chair), H. G. Dyer, W. Kessell, A. Moulds, E. Hart, E. Hawk, R. N. Cobbleclik, J. Rowe, W. Squires, and G. Prentice (Hon. Sec.).

SUMMER CABBAGES.—Mr. E. Hawke read a paper, in which he said good seed was the first essential in connection with the growth of summer cabbages. The variety selected should be one able to stand watering, as some rotted at the heart when irrigated. Plants saved for seed should be the first to come in. When cutting for market a good plan was to stake selected plants, and afterwards remove them. They should be as near round as possible, as this shaped vegetable weighed much better than the flat. Club root was a source of considerable trouble, but this could be overcome by draining the land well, and only planting it with cabbages once in three years. He advised one good hoeing after the plants had made a start. It was only then necessary to loosen the surface. The year prior to planting the ground should receive a good dressing of stable manure. Bonedust should be used at the time of planting, and sulphate of ammonia applied when the plants were little more than half grown; 2cwts. of bonedust and 1cwt. of ammonia should be sufficient for 1,000 plants. Mr. R. N. Cobbleclik thought too frequent cropping was a mistake. Applications of lime might to a great extent prevent club root. Mr. J. Rowe thought water should be run on to the cabbages rather than sprinklers being used. Chemical manure should be worked in shallow, and lime and salt would act beneficially on the soil. Mr. Mould thought cabbages should follow a crop of onions or green feed, and should be dressed with manure and ammonia at the time of the first hoeing. Applications of lime did good, and he would always grow the plants on new land. The practice of pumping water from creeks, he thought, encouraged the spread of club root.

SOUTH-EAST DISTRICT.

Glencoe, May 19.

(Average annual rainfall, 33'84in.)

PRESENT.—Messrs. A. Dow (chair), J. Dow, W. Childs, P. Cliford, H. A. Cameron, W. Holloway, W. Lehmann, G. F. Ferguson (Hon. Sec.).

SEEDING OPERATIONS.—A paper on this subject was read by Mr. J. Dow. When ploughing, he recommended cutting a furrow 4in. deep and about 9in. wide, the ground being worked up to a good seedbed. He preferred broadcasting the seed as, in addition to the saving of the cost and time involved in drilling, a better distribution was secured. However, where manures were being applied, the use of the drill was advisable. Oats should be sown as early as the end of February and beginning of March if the weather was suitable. Three or four months feeding could then be secured, after which the stock

could be taken off and the crop allowed to mature. Where it was not intended to follow this practice, the seeding should take place in July or August, as there was thus a smaller growth of straw, and the crop was better for harvesting. Barley for seed should be pickled in a solution of 1lb. of bluestone in 10galls. of water in a trough large enough to hold one bag of grain. It should be sown at the end of July or August, as, when sown earlier, it was in danger of being checked by the cold weather, when it would suffer considerably from the effect of weeds. His experience was that wheat was an unsuitable crop for this district. In discussing the subject, Mr. H. A. Cameron and the Hon. Secretary advocated sprinkling the bluestone solution on the grain, which had been previously emptied out on to a floor. Other members considered immersion in the solution preferable, as it was quicker and easier. Mr. A. Dow placed grain in a large tin with a perforated bottom, and lowered this into the bluestone solution, which he mixed in a cask. He dissolved the bluestone by suspending it in the water in a small bag. For this purpose Mr. W. Lehmann used hot water.

STOCK AILMENTS.—The President reported that some time ago he noticed that one of his cows had lost three front teeth. As the animal was 13 years old, and in good condition, he sold it to the butcher. Since then another animal, 7 years of age, had also lost three front teeth. Members were unable to explain the trouble. Mr. P. Clifford mentioned a cow which, for some time after calving, intermittently gave off strings of clotted blood with the milk. The reason assigned for this was that the cow had a small bag, which bruised very readily when distended.

HORSE-BREEDING.—At a previous meeting a paper on this subject was read⁴ by Mr. Holloway. Good stallions, he said, were essential to the procreation of good stock, but it was equally important that due care should be exercised in the selection of the mare. Haphazard breeding would not pay. The mare should have a well-shaped head, be roomy, not too long in the hind quarters, possess good, flat bone, a well-shaped body, and good legs with plenty of hair well placed. Browns, bays, with black points, and blacks were best, as animals of these colors usually possessed good feet. A good temper was essential. The high-priced stallion generally would be found the cheaper, as the sale value of the progeny at three years old was considerably higher. The stout-built horse, if a good mover, would be found best. In the case of both mares and horses the ancestry should be sound, and they should not be too far removed from the desired type. If the mare was deficient in hair she should be mated with a rough, coarse horse, and if leggy, with a low-set, thick stallion. The weak points of the mare should be noted, and a stallion particularly strong in these should be selected. Nothing was gained by mating young mares with light stallions the first time of service.

Millicent, June 10.

(Average annual rainfall, 29·25in.)

PRESENT.—Messrs. J. J. Mullins (chair), H. F. Holzgreffe, J. Bowering, H. Hart, and H. Day (Hon. Sec.).

PICKLING SEED WHEAT AND POTATOES.—Mr. Holzgreffe mentioned that he had tried formalin for pickling wheat, but he found no advantage over bluestone in it. He preferred the tub method, and used 1lb. of bluestone to 10galls. of water, allowing the wheat to remain in the solution for 15 minutes. Mr. Hart last year pickled some seed badly affected with smut with formalin, and the crop was quite free of the disease. He had also used it for seed potatoes with good results. Members said no benefit was obtained from pickling potatoes affected with grubs.

RABBIT DESTRUCTION.—In discussing prosecutions which had been made with regard to the non-destruction of rabbits, Mr. Holzgreffe mentioned that, whilst the Act relating to this matter was not too stringent, in the administration of the legislation due consideration should be given in cases where attempts had been made to comply with its provisions. Councils should put on men to do the work at the landholders' expense in preference to imposing fines on those who neglected to destroy the pest on their holdings. Mr. Hart thought the appointment of a Government inspector, who might overlook the work of those appointed by local bodies, would be an advantage. Mr. Mullins thought councils should own poison carts and carry out the work of destruction themselves when the farmers neglected it. Mr. Day said it should be compulsory to poison the rabbits between January 1st and 14th. Mr. Bowering had erected netting around his property, but the soft drain and undergrowth made it useless so far as the rabbits were concerned. He set traps the whole year round. It was agreed that hedges and other harbors for the pest should be destroyed.

RICKETS IN PGS.—Mr. Hart attributed rickets in pigs to the supplying of too much skim milk. Hard feed with the milk was necessary. Lambs were affected with this

trouble, which was a form of coast disease, due to insufficient phosphoric acid in the system. Artificial feeding was a cure. Mr. Bowring mentioned that skim milk from cows grazing on limestone country would not cause ricketts, as the lime strengthened the system of the animals. It was a kidney complaint.

Mount Gambier, June, 14.

(Average annual rainfall, 32in.)

PRESENT.—Messrs. Wedd (chair), Innes, Pritchard, Botterill, Wheeler, Crouch, Fowler, Major, Sassanowsky, Kilsby, J. F. Holloway, and D. Collins (Hon. Sec.).

RABBIT DESTRUCTION.—Mr. Botterill initiated a discussion on this subject. Section 20 of the Vermin Destruction Act, which imposed the duty on landholders of at all times destroying all vermin upon land occupied or owned by them, he said, left too much to the inspector. The court should be allowed to decide whether a person had honestly endeavored to destroy rabbits on his property. More good would be done by putting men on to destroy rabbits at the expense of the neglectful landholder than by fining him. Localization of the pest by means of wire netting was an absolute necessity. This should receive careful and frequent attention when erected. Where the value of the land would stand the expense, the best means of destroying the pest was digging them out. The most effective means in poorer country was poisoning. Men with holdings covering about 600 acres or 800 acres should be quite able to exterminate the rabbits thereon within two years: 17 gauge $1\frac{1}{2}$ in. mesh netting, 3ft. 6in. high, should be used. It should be put from 6in. to 8in. in the soil, and should always be on the outside of the fence. Mr. Holloway did not think 3ft. 6in. netting would be sufficiently high if put 8in. in the ground. He strongly favored the use of netting and digging out, but poison was unsatisfactory. Mr. Crouch mentioned that four rabbits ate more than one sheep. Many people neglected to make the baits strong enough when poisoning. The use of arsenic might cause a swelling in the face of the operator. Mr. Kilsby used charcoal, sulphur, and tar in a fumigator with good results. The Hon. Secretary poisoned the pest in summer, and then paid men to trap them. In reply, Mr. Botterill disagreed with the suggestion that it was better to use the money now spent in paying inspectors in securing wire netting at cheaper rates. He charged fumigators with cow manure and sulphur.

Naracoorte, May 10.

(Average annual rainfall, 22·60in.)

PRESENT.—Messrs. L. Wright (chair), W. Loller, W. H. Smith, A. Caldwell, W. E. Rogers.

COMPULSORY SHEEP-DIPPING.—A further discussion took place on this subject, which was introduced by Mr. Smith in a paper read at a previous meeting. It was decided that Branches of the Bureau south of Adelaide should be communicated with, asking them to discuss the proposal and give an expression of opinion on it.

CHAFF IN MANURE BAGS.—Mr. Loller pointed out that it was necessary to be careful when using super. bags for the storage of feed, as the acid used in the manufacture of the super. was injurious to stock. This sometimes sweated out of the manure and impregnated the bags. Other members had heard of no harmful effects where bags previously used for the storage of phosphates were used for chaff, and Mr. Rogers said that sometimes super. was mixed with salt or iron and fed to stock.

Penola, June 7.

(Average annual rainfall, 26·78in.)

PRESENT.—Messrs. H. Richardson (chair), A. E. Lampe, S. L. Norman, J. Darwent, D. McKay, A. H. Strong, P. H. Kilsby, T. Yeates, W. Hoffmann, D. Adamson, J. F. Warner, J. T. Williams, H. Ricketts, L. W. Peake, S. Ockley (Hon. Sec.), and one visitor.

MANURING ORCHARDS.—The Chairman said he had during the last three years applied fertilizers to fruit trees, but he was unable to credit the applications with any material returns. However, every year since he applied super. to vines the returns had increased substantially. Mr. Darwent had broadcasted and ploughed in $1\frac{1}{2}$ cwt. super. per acre in his vineyard during the past three years, and there had been a yearly increase in the returns. In some instances, continued heavy applications of manure caused a superabundance of wood growth, making picking difficult. Super. caused the vines to retain their foliage—the sap continued to rise, consequently the fruit filled better. After applications of potash to apple trees it was found that the fruit colored much better, and a fortnight earlier than other years. Ammonium sulphate had increased the foliage on walnut trees, and best

crops had been gathered from trees treated with this. It paid handsomely to apply lime and fertilizers to fruit trees. In porous soils, where the rainfall was equal to that of Coonawarra (26in.), it was not necessary to put manure in deeply. Mr. Williams had had very conflicting results from different parts of the orchard this year. Some of the apples which had not received any fertilizer had colored better and earlier than in former years. The returns from one vineyard, unmanured, had been equal to those from one manured. Both had received manurial dressings last year, and probably the effects were now becoming apparent. Mr. Hoffman had applied 2cwts. of super. per acre to 6-acres of vines for three years past. Previous to the treatment 4 tons were picked from the 6 acres. After the first application 13 tons were secured, after the second 21 tons, and the third year's yield was 27 tons. He attributed the results to the super.

Tatlarra, May 10!

(Average annual rainfall, 19in.)

PRESENT.—Messrs. Stanton (chair), Duncan, A. Fisher, P. Marshall, Sullivan, J. Stoude, Prescott, Bond, and Freeman (Hon. Sec.).

SILOS.—The following paper was read by Mr. L. S. Duncan:—"Farmers should exercise caution and make provision for future possibilities. The past season shows the necessity for reserve fodders; and from the forecast presented by men who make the weather conditions their study, the future season will, in all probability, be of a similar nature. The records of our State show that in every instance when the summer has been below the mean temperature, the winter following has been dry and feed has been scarce. To cope with this possibility, every farmer should have a reserve supply of fodder. Hay is grown as a means of revenue and to meet general feeding of the farm. Such a fodder is too valuable to keep as a reserve, for when the pinch comes, its value in the market makes it almost imperative that the farmer should avail himself of the opportunity of selling at a good price. My contention is that each farmer who runs mixed stock—sheep, cattle, and horses—should have a silo on his property. Its value is incalculable, as it may be filled with all odds and ends of growth, and there it remains sweet and wholesome, until required. Its cost is only a small item; £35 will cover timber and erection (including elevator) and a fortnight's work before the main harvest is ready is sufficient in which to cut the crops and fill the silo. Many farmers could arrange for small plots, such as maize, oats, barley, rye, wheat, wild oats, sour thistles, peas, grasses, &c., for silage. Silos have been used with the greatest success in Victoria; and Mr. W. T. Hoare, of Apsley, relies on the silage solely to keep his stud ewes in condition for the lambing season. Stock ravenously devour it in preference to the dry feed, and even fats have been prepared on this fodder. Silage should stand in the air for about 24 hours before being fed to horses." In view of this not being a dairying district, one member thought the suggestions of the writer of the paper inapplicable locally. The case of a farmer who had been making silage for a number of years was mentioned. In reply, Mr. Duncan said the idea was for the farmer to grow green feed and preserve this for stock in the event of a bad season.

Wirrega, April 19.

(Average annual rainfall, 19in. to 20in.)

PRESENT.—Messrs. H. Exton (chair), P. Prime, H. Laurenti, J. Bice, R. Langdon, L. J. Cook (Hon. Sec.), and one visitor.

FENCING.—In a paper dealing with this subject, Mr. Prime said that where Wirrega gum was being used, fencing posts should not be less than 5in. by 6in. on top and 5ft. 4in. in length, and should be in the ground 22in. It was a good plan to clear a few feet on either side of the fencing line; this would be a fairly reliable safeguard in case of fire. If no droppers were being used the posts should be placed 11ft. apart. A good scrub fence could be made with one wooden post, three droppers, and two iron posts for every chain. Five plain wires, with one barbed wire on top, should be used. At least one No. 8 wire should be included in this. Strainers should be put 10 chains apart and the wires could be tightened by the jinny being placed in the centre between the strainers. The strainers should be of fair length, and for good clay ground they should be in 2ft. 9in. Where the land was sandy 4ft. was not too deep. A substantial rail was required for a strut, and this should be placed between the two top wires. A solid piece of wood, such as a post cut in halves, was necessary as a block at the other end. The barbed wire on top should be wired to the post, as the stock, on putting their heads through the wires, frequently levered staples out. The fencing line should be pegged out, sight being taken from behind that already erected. Wherever possible, wire netting should be used.

I. A. R. I. 75.

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